SCIENTIFIC AMERICAN

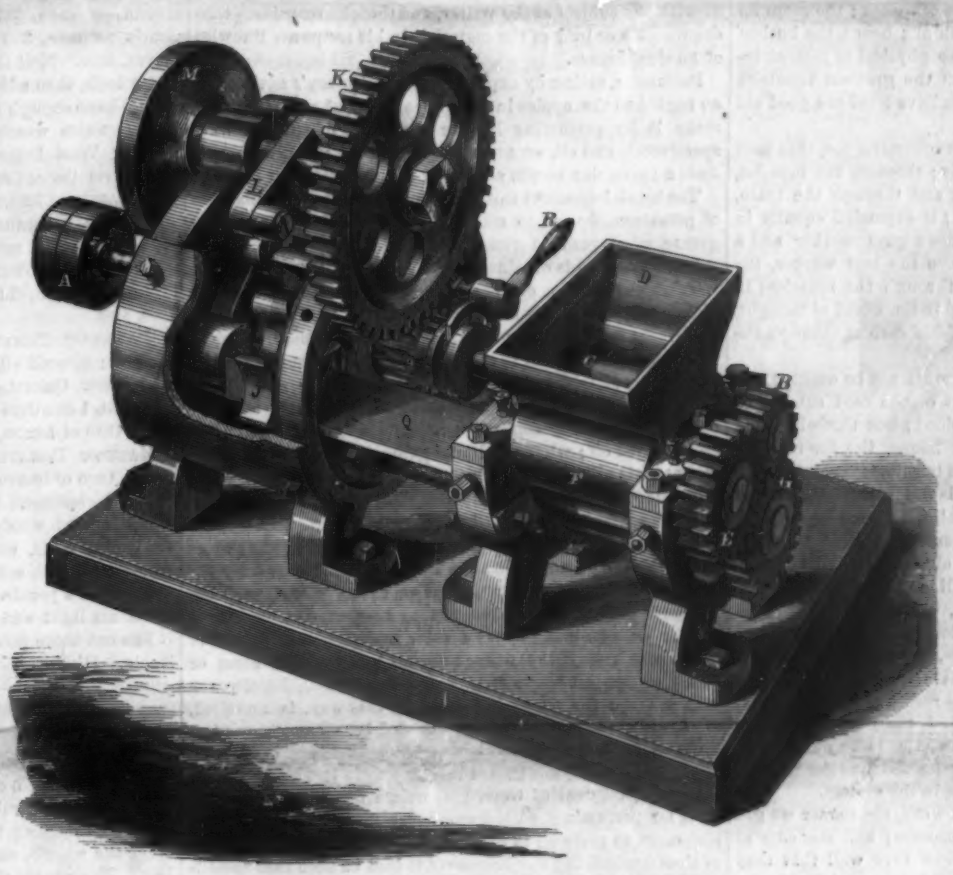
A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES

Vol. XVIII.—No. 24. [NEW SERIES.] NEW YORK, JUNE 13, 1868. $3 per Annum [IN ADVANCE.]

Improvement in Molding and Pressing Bricks.

The machine represented in the accompanying engravings will arrest the attention of brick makers and other mechanics, from its compactness and its ingenious application of mechanical movements. It is direct and absolute in its action, dependent upon neither springs nor weights for correctness, and built of iron, so that there is but little wear and tear.

The machine is driven by the pulley, A—horse, steam, or any other power being used—the shaft having on its further end a gear, B, and a roller, C, which latter revolves in a hopper, D. The gear on the driving shaft engages with a larger one, E, which drives a corresponding roll, F, that, of course, turns slower than the roller, C. The clay—properly moistened—put into the hopper, D, passes between the rolls, being subjected to a comminuting or pulverizing process, in consequence of the abrasive action of the two rolls, the surfaces of which travel at varying velocities. From the rolls the fine clay is carried through a horizontal cylinder under roll, C, by means of a shaft driven by the gear, G, on which shaft are a series of spiral blades, H, Fig. 2, each of which forms a section of a screw, those at the discharge end, however, forming a complete screw extending entirely around the shaft. By this means the clay is carried from the mill to one of the press boxes, seen at I, Fig. 2, which are within a cylinder or disk, J, which revolves on a fixed hub secured to one of the standards of the machine, and through which the main shaft passes loosely. The press boxes, or brick molds, are placed at equal distances apart in the cylinder, which is revolved by a shaft driven by the gear, K, that is rotated by means of a pinion on the driving shaft. A crank, L, on the upper shaft, carrying the gear, K, having a friction roller on its wrist end, gives an intermittent motion to the cylinder, J, by means of recesses in the cylinder or disk; the rotation of the disk to produce a complete revolution, being assured by two gear teeth cut in what may be considered the hub of the crank, and engaging with similar teeth on the periphery of the disk.



HAYDEN'S IMPROVED BRICK MACHINE.

On the outer end of the shaft carrying the gear, K, and crank, L, is a cam, M, which drives a plunger, N, Fig. 2, against the press piston, O, same figure, compressing the clay in the mold and forming the brick. At the same time, and by the operation of the same cam, a lever, P, actuates another plunger, that throws out the pressed brick upon a table, Q, Fig. 1, from which it is removed to the yard or other convenient place for drying.

The lever and clutch, R, are for disconnecting the mill and the press, so that the former can be run without operating the latter. The boss of the crank, L, after the disk containing the molds has been moved, so that the plungers and mold boxes are in line, traverses around a half of a revolution without imparting motion to the disk, thus affording time for the action of the plungers. It will be seen that at the same time that one mold box has received a charge, another is being carried to the plunger, the plunger is compressing a third, while the fourth is being discharged upon the table.

Patent pending through the Scientific American Patent Agency. Address all inquiries to the inventor, Peter Hayden, Pittsburgh, Pa.

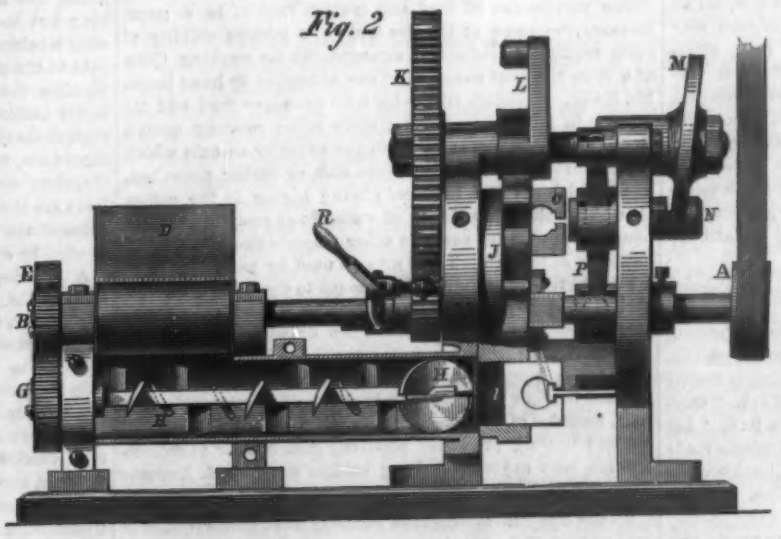
MIND AND CHARCOAL.

Doctor Hall, in his *Journal of Health* for June, has the following instructive article which we hope every one will read notwithstanding its length:—

The diamond, the most valuable thing in Nature, so sparkling, so beautiful and bright, whose luster does not pale a particle in the lapse of ages, is but another condition of carbon, or charcoal, which you cannot touch without soiling your fingers; beautifully shadowing to us that greater change which shall come over the frail tenement of man, when it shall be raised "a spiritual body," fit for the heavenly mansions, and destined to a beatific existence when time shall be no more. But the human mind cannot act without the agency of carbon, and by this same agency do the trees grow, and the flowers bloom, and the connection between these is called "The Correlation of Mental and Physical Force," which phrase we were afraid to put at the head of this article, lest the reader should be frightened by its apparent abstruseness and skip it over; for all like the kind of reading best which requires the least thinking; the newspapers, civil, religious, and mongrel, have found this out, and load their columns with all sorts of impossible fabrications, as weak as water and as wishy-washy as cold soup; but publishers know that "there is money in it," the thoughtless public are pleased, and down we are going, at railroad speed "*ad infernum*."

Carbon represents heat; vegetation grows by absorbing carbon; and the hotter the climate, the faster does vegetation grow. At the poles there is no carbon, and there is no vegetation. When a tree is growing, it absorbs as much carbon as it will give out, when it is cut down and burned; if a pound of carbon, or wood, is burned and applied to water, so as to make steam, that steam, if economized, will raise a man to the top of Mount Washington. But if a man wants to go to the top of Mount Washington, he can raise himself up there by the force of his will, acting on his feet; but in order to do this, the brain must act upon the muscles of the body, and to do that, carbon must be supplied to it; this carbon is obtained from the food we eat; and unless we eat food which contains carbon, we will soon die, as the body gets cold; in a sense, freezes. Thus we see that carbon, acting on water, will raise a man sky-high; this is called "physical force;" carbon feeding the brain, enables a man to will him self to the same altitude, and away he goes, as fast as his legs will carry him; this is the result of "mental force," and now the reader sees the connection between physical and mental force, that they accomplish the same result, and by the use of the same agency, heat, obtained from carbon, or charcoal. That is to say, the vital force of the body and of the vegetable, is generated by carbon. It would be useless to bother the reader with this long rigmarole, unless we could derive from it some practical lesson, by which we can be made better or happier. The largest specimens of vegetation and animals, grew in the earlier ages, in parts where the atmosphere was a furnace; and as the crust of the earth cools, both grow more slowly, and the time for dying comes before they reach as great a stature as of old; and so it must be with man, the more carbon he absorbs, the more food he can eat and appropriate healthfully to the bodily uses, the larger or stronger will he be, according to whether the greater amount of carbon is absorbed by the brain or muscles; it is the stomach which is to prepare the food for the elimination of the carbon contained in it; this process is called "digestion," hence, the more perfect, the more vigorous; the more healthful a man's digestion is, the more vigorous will he be in mind or body, if not both; so whatever we do to weaken, to disease the stomach, we do that much toward impairing mind and body; toward depraving the race; degrading it toward the mere animal and the idiot. If we eat just enough, both mind and body are invigorated; if we eat too little, both become weak and faint; the body trembles, the mind is inefficient; if we eat too much, the stomach cannot eliminate the material which is to give out a pure carbon, and it then gives out an impure article, and mind and body are oppressed; the former loses its activity, the latter its vigor. Farming or any other active out-door life tends to perfect digestion; city life, with its inactions and its intemperances impairs the digestion, then follows the startling truth, and known to be truth, the world over, that families in cities, whole family names, die out in two or three generations; it has been stated that it rarely happens that a grandchild reaches maturity in Paris; scarcely a dozen of the same prominent family names are found in the New York City Directories of 1868, which were in the directory of 1802—just two generations ago; and but for the replenishment of lads from the country, the progeny of hard out-door workers vigorous of stomachs, eliminating carbon largely, so as to give power to produce children of robust health, New York would be almost depopulated in a comparatively short time. These are serious truths, and to antagonize such results, let every child born in New York, and whose father and grandfather were born in New York, be sent to the country during the first month of its life, to be brought up to out-door labor, so as to renew the constitution. The intelligent reader will feel a very deep interest in these statements, and will regard them as general truths, to be modified by antagonizing circumstances, but not the less true and practical for all that. Let us recapitulate. As much heat or carbon is absorbed by a tree during its growth, as it will give out when it is burned, so as much bodily and nervous energy will be given out by a man, as the carbon contained in the food which he eats will supply.

Fig. 2



But it does not follow that the more a man eats the more carbon will he absorb, and, consequently, the larger, stronger, and more intellectual will he become; these depend on the healthful vigor of his digestion, because it is this which prepares the food for the separation of the carbon in it, previous to its absorption into the system; and as an active out-door life is the best means known for securing a perfectly healthful digestion, the inference is fair, logical, and legitimate, and observation will prove its truthfulness, that out-door activities, for the first thirty years of life, at least, are very certain to be followed by high health, bodily power, intellectual

ability, and long life; this intellectual activity being greater or less, according to the greater or less size of the brain proper, which is that portion which lies in the front and upper region of the head.

The mind acts on the body through the brain, making the brain in the nature of a machine, whose working involves waste, and the necessity of repair or renewal, as oil to the wheels of vehicles of locomotion; this renewal is made from the food we eat; the faster a physical machine runs, the faster will it wear out, and there is no help for it; but the human machine had Divinity for its architect, and it does not follow that the faster or more vigorously it works, the more intense the thoughts and sensations, the sooner will it decay; but it only follows that the harder a man works, or thinks, or the more intense are his sensations, the more nourishment must be given to the muscles which work, and to the brain, through which comes our sensations; that is, the more carbon must be supplied to the system; and as was before noticed, that the greater the amount of carbon supplied, the larger was the tree, the greater the animal, the more vigorous the action of the brain—the mental work, it therefore follows that the human machine increases its physical and mental capabilities by the very increase of its activities; that the more a man works, the more and better he can work; the more he thinks, the more and better he can think; hence, the busiest men live the longest, whether it be physical or mental industry; thus, Newton, and others of the greatest intellects in physics, in theology, and in ethics, have lived to a good old age.

But it is a beautiful thought, and suggestive, too, that man expends his carbon in two directions; through the muscles, enabling him to work a great deal; and through the brain, enabling him to think a great deal; if expended equally in these two directions, a man becomes a good worker and a good thinker; but if he would become the best worker, the excess of carbon must be expended through the muscles; if, on the other hand, he desires to excel in the world of thought, he must expend the greater share of his carbon through the brain.

But another beautiful thought must not be omitted. A good digestion takes the carbon out of the food eaten and throws it into the circulation, the blood; but throwing coal into a furnace will not warm the house, the fire must be kindled; the coal must burn, and its burning gives out heat; this is called combustion; the body is the furnace, the carbon put into it by eating, is its coal or fuel, but it must be kindled, must be set on fire by having oxygen introduced: we know that a fire will not burn unless the air can get to it and supply it with its oxygen; so, also, will not the carbon in the blood kindle into warmth and heat, unless a plenty of good air is introduced into it, which is done by breathing it into the lungs, where all the blood goes, and so, being brought into contact there, the oxygen of the air and the carbon of the blood join, and combustion is the result, giving out heat, fire, warmth; and as the out door air is the purest, freshest, and best, the more we are out of doors, the more oxygen we get, the more perfectly the carbon is burned, and the greater the amount of healthful heat is there in the system.

We all know that the harder we work, the sooner we get tired and the more hungry we become; and students at school, and academy, and college, know very well that they grow weak by hard study; and that their appetites become so imperative and exacting sometimes, late at night, that remorseless contributions have been made on neighbors' corn cribs, dairies, orchards, melon patches, and henneries. Who does not now feel that we have made "the correlation of the mental with the physical forces" as plain as a pike-staff, and very interesting, too; that shows our genius. Reader, don't you feel that it is a plain matter, after all? Any body can make an egg stand on end, after a Columbus has shown him once how to do it!! But O, how little of the immeasurable world of truth does any man know, do all men know! Balloons for ordinary traveling purposes may yet be contrived; some may think that a man may, sometime, travel as fast as a telegram, and who knows but that the science of "mind and charcoal" may be so systematized, that a man may prepare himself for a specified amount of labor by eating a specific food of a specific quantity, may graduate the intensity of his sensations by the measure of his meat; and when conscience reproves him for the meanness of marrying that pretty girl for her money, he may excite a pure and disinterested and raging love, by the articles ordered from Professor Blot!!

POMADES AND OILS.

According to ancient writers, unguent, pomatum, ointment are synonymous terms for medicated and perfumed greases. Among Biblical interpreters, the significant word is mostly rendered "ointment;" thus we have in Prov. 27:9, "Ointment and perfume rejoice the heart;" in Eccles. 9:8, "Let thy head lack no ointment." "The sons of the priests made the ointments of the spices" (1 Chron. 9:30); "Hezekiah was glad, and showed them his treasures, his spices, and the precious ointment" (Isa. 39:2).

Oiling and greasing the hair is a custom pretty nearly universal among the people of all civilized nations. There are oil-glands on the scalp, but their power of secretion is very slight, except in a few rare instances; in these cases the hair is said to be naturally moist and soft. The general rule is, that the hair grows harsh and "dry" for the lack of natural oily secretion, hence the instinctive application of an artificial oil, a practice hallowed by its ancient custom, and sanctioned as "necessary," from the court beauty of St. James's to the belle of equatorial Africa. M. Du Chaillu, speaking of the use of njavi oil by the natives of Goumbi, says:

"They mix the njavi oil with a kind of odoriferous powder called *yombo*, and this mixture is then applied in great quantities upon their wool (*i. e.*, hair). They think it gives out a pleasant fragrance, but I differ from them."

Now, oiling the hair, besides making it glossy and soft, has the infinite benefit of rendering it "uninhabitable;" a consideration too often neglected in schools, and similar institutions.

The name of pomatum is derived from *pomum*, an apple, because it was originally made by macerating over-ripe apples in grease.

If an apple be stuck all over with spice, such as cloves, then exposed to the air for a few days, and afterwards macerated in purified melted lard, or any other fatty matter, the grease will become perfumed. Repeating the operation with the same grease several times produces real "pomatum."

According to a recipe published more than a century ago, the form given is:

"Kid's grease, an orange sliced, pippins, a glass of rose water, and half a glass of white wine, boiled and strained, and at last sprinkled with oil of sweet almonds."

The author, Dr. Quincy, observes, that "the apple is of no significance at all in the recipe," and, like many authors of the present day, concludes that the reader is as well acquainted with the subject as the writer, and therefore considers that the weights or bulk of the materials in his recipe are likewise of no significance.

Perfumers, acting by experience or Dr. Quincy's advice, pay no regard to the apples in the preparation of pomatum, but make it by perfuming lard or suet, or a mixture of wax, spermaceti, and oil, or some of them or all blended, to produce a particular result, according to the name that it bears.

The most important thing to consider in the manufacture of pomatum, &c., is to start off with a perfectly inodorous grease, whatever that grease may be.

Inodorous lard is obtained thus:

Take, say, 28 lbs. of perfectly fresh lard, place it in a well glazed vessel, that can be submitted to the heat of a boiling salt water bath, or by steam under a slight pressure; when the lard is melted, add to it one ounce of powdered alum and two ounces of table salt; maintain the heat for some time, in fact, till a scum rises, consisting in a great measure of coagulated proteine compounds, membrane, etc., which must be skimmed off; when the liquid grease appears of a uniform nature, it is allowed to grow cold.

The lard is now to be washed. This is done in small portions at a time, and is a work of much labor, which, however, is amply repaid by the result. About a pound of the grease is now placed on a slate slab, a little on the incline, a supply of good water being set to trickle over it; the surface of the grease is then constantly renewed by an operative working a muller over it, precisely as a color maker grinds paints in oil. In this way the water removes any traces of alum or salt, also the last traces of nitrogenous matter. Finally, the grease, when the whole is washed in this way, is remelted, the heat being maintained enough to drive off any adhering water. When cold it is finished.

Although purifying grease in this way is troublesome, and takes a good deal of time, yet, unless done so, it is totally unfit for perfuming with flowers, because a bad grease will cost more in perfume to cover its *mal odeur* than the expense of thus deodorizing it. Moreover, if lard be used that "smells of the pig," it is next to impossible to impart to it any delicate odor; and if strongly perfumed by the addition of ottos, the unpurified grease will not keep, but quickly become rancid. Under any circumstances, therefore, grease that is not perfectly inodorous is a very expensive material to use in the manufacture of pomades.

In the South and flower-growing countries, where the fine pomades are made by enfleurage, or by maceration, the purication of grease for the purpose of these manufactures is of sufficient importance to become a separate trade.

The purification of beef and mutton suet is in a great measure the same as that for lard; the greater solidity of suets requires a mechanical arrangement for washing them of a more powerful nature than can be applied by hand labor. Mr. Ewen, of Garlick Hill, who is an extensive lard and fat purifier in London, employs a stone roller rotating upon a circular slab; motion is given to the roller by an axle which passes through the center of the slab, or rather stone bed, upon which the suet is placed; being higher in the center than at the sides, the stream of water flows away after it has once passed over the suet; in other respects the treatment is the same as for lard. These greases used by perfumers have a general title of "body," tantamount to the French nomenclature of *corps;* thus we have pomades of hard corps (suet), pomades of soft corps (lard). When drawing *extraits* from the enfleuraged grease, such as *extraits de violette*, jasmin, the pomades of hard corps are to be preferred; but when scented pomade is to be used in the fabrication of unguents for the hair, pomades of the soft corps are the most useful.

The following process of purifying grease prior to enfleurage has been expressly written for this work by M. Auguste Bermond, of Nice:

"Take one hunredweight of perfectly fresh grease, either of lard or beef suet; cut the grease into small pieces, and pound it well in a mortar; when it is well crushed, wash it with water repeatedly, so long, in fact, until the water is as clear after withdrawing the grease as before it was put in. The grease has now to be melted over a slow fire, adding thereto about three ounces of crystallized alum in powder, and a handful of sea salt (common salt); now let the grease boil, but allow it to bubble for a few seconds only; then strain the grease through fine linen, into a deep pan, and allow it to stand, to clear itself from all impurities, for about two hours. The clear grease is then again to be put into the pan, over a bright fire, adding thereto about three or four quarts of rose water, and about five ounces of powdered gum benzoin; it is allowed to boil gently, and all scum that rises is to be removed, until it ceases to be produced; finally the grease is put into deep pans, and when cold taken carefully off the sedimentary water; it is then fit for use, and may be kept for an indefinite period, without change or turning rancid."

It will be observed that the principal feature in this process is the use of benzoin.

Dr Redwood has recently directed the attention of chemists to the fact that certain ointments, particularly zinc ointment, will not become rancid, if a little gum benzoin, or benzoic acid, is added to it when made; that such is the case there is little doubt, for it has been remarked that the prepared fat used by the flower farmers in the process of enfleurage will remain sweet for some years, provided that it be digested for a time over gum benzoin, in the process of its purification,—a practice that has been generally worked for this century at Grasse, Cannes, and Nice. It therefore only becomes only a question of experiment, to determine whether benzoin be a true antiseptic to all fatty bodies.

Pomade called Bears' Grease.—The most popular and "original" bears' grease is made thus:—"Huile de rose, Huile de fleur d'orange, Huile d' acacia, Huile de tubereuse and; jasmin—of each, ½ lb; Almond oil, 10 lbs.; Lard, 12 lbs. Acacia pomade, 2 lbs.; Otto of bergamot, 4 oz.; Otto of cloves, 2 oz. Melt the solid greases and oils together by a water bath, then add the ottos." Bears' grease thus prepared is just hard enough to "set" in the pots at a summer heat. In very warm weather, or if required for exportation to the East or West Indies, it is necessary to use in part French pomatums instead of oils, or more lard and less almond oil.

Circassian Cream.—Purified lard, 1 lb.; Benzoin suet, 1 lb.; French rose pomatum, ½ lb.; Almond oil, colored with alkanet, 2 lbs.; Otto of rose, ½ oz.

Balsam of Flowers.—French rose pomatum, 12 oz.; French violet pomatum, 12 oz.; Almond oil, 3 lbs.; Otto of bergamot, ½ oz.

Castor Oil Pomatum.—Tubereuse pomatum, 1 lb.; Castor oil, ½ lb.; Almond oil, ½ lb.; Otto of bergamot, 1 oz.

Marrow Cream.—Purified lard, 1 lb.; Almond oil, 1 lb.; Palm oil, 1 oz.; Otto of Cloves, ½ drachm; Otto of bergamot, ½ oz.; Otto of lemon, 1½ oz.

Marrow Pomatum.—Purified lard, 4 lbs.; Purified suet, 3 lbs.; Otto of lemon, 1 oz.; Otto of bergamot, ½ oz.; Otto of cloves, 3 drachms. Melt the greases; then beat them with a whisk, or flat wooden spatula, for half an hour or more; as the grease cools, minute vesicles of air are inclosed by the pomatum, which not only increase the bulk of the mixtures, but impart a peculiar mechanical aggregation, rendering the pomatum light and spongy; in this state it is obvious that it fills out more pots than otherwise, and hence is more profitable.—*Piesse.*

THE CLOCK.—HOW TO USE IT.

A clock is a machine composed of wheels and pinions, to keep up the oscillations of a pendulum.

The wheels of a clock are made to revolve by means of a weight or spring called the maintaining power. This power must be sufficient to overcome the resistance of friction, to move the wheels, and to maintain the motion of the pendulum. The wheels of the clock are connected to the pendulum by pallets, which, at the same time that they check the impetus of the wheels, receive their impulse to keep up the motion of the pendulum.

The escapement of a clock is that part by means of which the rotary motion of the escape wheel is made to produce an oscillating motion in the pendulum. Clocks are made with different kinds of escapements: the recoil or common pallets, the dead beat, and the free or detached. They are also made with the lever and pallets similar to watches, for clocks subjected to different motions, such as for ships' use, railroads, etc.; but these last are never made with a pendulum, but with a balance. Ordinary clocks, to which attention has been paid to the proper action, measure time more accurately than watches, the continuance of motion in the pendulum being better understood, and its irregularities more easily corrected than those of a balance. Long pendulums are preferable to short ones, for the greater the length the slower the motion, therefore error is less in a long pendulum. Heavy pendulums are the best, from being less under the variable influences of the impelling power, they are also less liable to be effected by external motion.

A light pendulum shows a clock badly constructed, or deficient in the power necessary for good performance. On selecting a clock, it should be observed whether the pendulum occupies the whole available length of the case; if not, it shows inattention to this advantage. The only exception to this rule is regulators and clocks which have the pendulums beating seconds, and measuring three feet three inches in length; this length is sufficient to insure accuracy. Although weight is preferable to spring as a maintaining power, yet fashion, perhaps, more than convenience, has caused a greater demand for spring clocks. Those which require to be wound oftener than once a week, having a less marked time, are objectionable from the same cause. Clocks are frequently made to go only thirty hours, on account of cheapness, and will keep tolerably good time; but those going eight days are to be much preferred, as in winding it will frequently alter the time a trifle. Small clocks have short pendulums, and from their lightness are liable to be stopped; they should therefore be made as heavy as convenient, and when lead can be put into the case to add to its weight, there is less risk of it being moved accidentally. The additional weight also steadies the suspension, and produces more equal motion in the pendulum, but when the expense can be incurred, it is better to have small clocks made with a balance, as they can be moved with-

out disarrangement. In moving a clock without a pendulum, be particular after you have placed it where you wish it to stay, to listen if the beats are regular; if not, you must make them so by either raising or lowering one side of the clock. Should it be a hanging clock, something should be put at the sides to keep it steady, and in its place, otherwise frequently in winding it, it may get disarranged from its beats, and stop. The heavier the pendulum is, the better it must be in beat. Clocks on brackets, or on feet, for mantels, etc., can be put in beat by raising or lowering one side to make it beat regular. Clocks are regulated by lengthening the pendulum to make them lose, and by shortening it, make it gain. This is done either by the insertion of a key to turn an arbor or square, which lengthens or shortens the pendulum, or by turning a nut for the same purpose. Nearly all the French clocks have the pendulum hung on a fine spring; these mostly regulate by a square at the top of the dial; others have them hanging on a piece of silk, with one end fastened around a wire, which is turned either from the back of the clock by a knob at the end of the wire, around which the silk winds itself, or else by a square, to which a key is fitted in the front part of the clock.

All clocks, whether regulated from the back or front, are made to gain by turning the key or nut to the right, the way in which the hands are set forward, and the contrary to make it go slower. When the screw is under the weight of the pendulum, it is also turned in the same direction; but when the screw is above the weight, the rule is reversed. Do not move the hands of your clock back past the twelve, or you will disarrange the striking; the hands can be moved rapidly forward until they are made to correspond with the hour struck; or the minute hand may be advanced to within two or three minutes of the hour, and then brought back sufficiently to allow the clock to strike, this is repeated until the hour struck is the same as shown by the hands, which should be set forward to show the proper time, suffering each intervening hour to be struck progressively. This applies to French clocks, and to most of the American ones; some, however, are made with a small rod in the case, under the dial, which, by being pushed or pulled, will make the clock strike; in this case, make it strike each hour separately, until you get it correct. But should the hours not strike regular in succession, then show it to some clockmaker, for there is a defect which he can correct.

The hands of English clocks may be turned either way without injury, the same as with a watch, except when having an alarm.

This is all that suggests itself to me as being useful to the public, except this caution: if there is any thing that you do not understand when a clock is out of order it is better to apply to a clockmaker than to attempt to correct it yourself, as by so doing you make bad worse, and increase the cost of repairing.—*H. F. Piaget.*

THE WATCH—ITS HISTORY AND MANUFACTURE.

BY H. F. PIAGET.

No. 6.—Conclusion.

NECESSARY PRECAUTIONS AND ADVICE TO PERSONS WEARING WATCHES.

The watch requires care, and it is not enough that the maker is one of character, and that a proper price has been given for it, unless necessary precaution is taken to insure good performance. The watch should be regularly wound up as nearly at the same time as possible, since few springs are so equally adjusted as to pull with the same force during the whole time of action, which is usually about thirty hours; therefore by winding every twenty-four hours, it will leave six hours for the weakest part of the spring to remain idle.

Always have a key with a good pipe or square, and one that fits properly on the square of your watch, for if it does not fit good and firm, it will be apt to slip, often breaking either the chain, the ratchet, or the click. If the square of your watch is too short, or worn nearly round, get a watchmaker to repair it, or make a new one. Be particular to wind your watch the proper way. English watches, or those with fusee and chain, usually wind to the left, and almost all the Swiss ones, or those with the going barrel, wind to the right. While being wound, the watch should be held steadily in one hand, so as to have no circular motion, which always produces variation of the vibration of the balance, and sometimes considerable derangement in the escapement. It is better to keep a watch continually going, than to lay it by and wind it up occasionally. The going of the watch keeps the oil in a limpid state, and the watch keeps its regulation better. Many will (when their watch is first wound up, after having lain by for some time) say, "I have not wound or used it for so long." They do not consider that the oil will thicken or evaporate, and cannot be in the same state as if the watch was kept going regularly. Always wind steadily and slowly, holding on the key to hold the spring while the click slips from one tooth to the other, otherwise there is danger of breakage of chains, clicks, ratchets, etc. The click chain or spring is sometimes broken by winding a watch too fast. When a watch stops in winding it, if in one with a chain, it is frequently by the going fusee works not being correct, or it may stop by the escapement not being correct. In a watch without a chain, it may also be by some defect in the escapement, or by the stop works on the barrel being out of order; in either case, take it to a watchmaker.

Watches frequently stop by the springs breaking, owing to the changes of the atmosphere, particularly in cold weather. That is one of the accidents which cannot possibly be avoided by the best workmen, and in the very best watches. It is impossible to make a main spring which will not be influenced by the sudden changes of the weather. Therefore, if the spring of your watch breaks, do not blame the watchmaker, as they often break from the same cause while the watch is in his care. I have frequently, on taking watches out of the safe in the morning, that had been put in, in good order on the previous evening, found several with the springs broken; in that case, it is generally more loss to the workman, than to the wearer of the watch.

Be not afraid that your watch will not go as well after a new spring has been put in as before; if a good new spring has been properly put in, your watch will go as well as ever.

English, or watches with chains, will usually wind about four and a half turns to every twenty-four hours, while those with a going barrel about three and a half turns; this will partly serve as a guide to ascertain if your watch winds right.

If the springs or chains break frequently, be sure there is some defect in the stop work, which must be corrected by a watchmaker.

Many persons say, "I have overwound my watch;" it may be possible to do it in winding very fast, and in a hurry. If the stop works of a large and thick watch, or one with a chain are in order, it will take a strong key to resist the strain that you can give to overwind it. If not in order the chain will break. In a flat watch, or one with a going barrel, if the stop works are not in order, or there is only one, or perhaps none, and you force it, you will break the spring, or some of the teeth of the wheels, or pinions, and sometimes both; if when the spring is broken you keep winding, you are likely to break or injure some other parts of the works.

Be particular never to trifle with a good watch, or use it as a toy, but as a piece of delicate and complicated mechanism, requiring great care; by so doing, you may preserve your watch, and avoid a great deal of expense for repairs.

Before winding or setting your watch, it is advisable to see that the key and the inside of the pipe contain no dirt or dust that may get on the winding or setting square, and from thence to the wheels or escapement.

When a watch is hung up, it should be perfectly at rest. If hung on a round hook without further support, the motion of the balance will generate a pendulous motion of the watch, and will cause much variation in the time. Powerful watches should never be laid horizontally, unless placed on a soft substance; if placed on a smooth flat surface, from the convexity of the glass or case, the watch only rests on a point, and the vibration of the balance alone is sufficient to produce motion in the watch.

Should a watch stop, see if the hands rub on the dial, and are free of each other, if they are caught together you may free them yourself by taking the point of a small knife blade, and disengaging them; your watch, if there is nothing more the matter with it, will then start by giving it a slight shake.

Frequently after a watch has had a new glass put in, it will stop; that is through the glass being too flat, and touching either on the center pinion, or by pressing on the hands; in that case, blame the person who put the glass in, and let him put another in; if there is not, as in very flat watches, room enough for the hands to work free of each other, it will often be advisable to have the cover of the case raised a little; in thin watches, the case may have been pressed flat in the center by wearing.

If anything is the matter with your watch which you cannot discover immediately, do not try to put it in order yourself, and meddle with the works, but show it at once to a good watchmaker. I have had watches to repair in which the wearer thought he could detect the defect himself; in opening it, he would see the spiral spring, and think that it was some hair which had no business there, and in trying to remove it, would spoil or break it.

Many watches are injured by the wearers thinking that they can make them go by opening, winding, and shaking them.

Watches should be opened as little as possible, merely to wind, set, or regulate them. By continually opening them, particularly in the inside cap, opportunity is offered to minute particles of dirt from the case, or otherwise, to intrude into the works. I have known many watches which had been recently cleaned, stopped by some small particle of dirt sticking fast between the teeth of some of the wheels, particularly near the escapement.

Should a watch get wet by falling in the water or otherwise, if you are not near a watchmaker, as soon as possible open it, and pour in some oil, any kind will do in an emergency, but olive oil is the best; as soon after as convenient place it in the hands of a watchmaker, and if attended to in time, the whole movement, or at least many parts may be saved. If left too long without oil, to prevent rusting, particularly if wet with salt water, the steel works will be past repair.

If a watch is not regular in its vibrations, which can be discovered by any one having a good ear, take it to a watchmaker, and let him correct it. This only applies to the verge, cylinder, anchor, or lever watches; in the duplex and chronometer escapement, the beat or vibrations being very different, none but an experienced watchmaker will know if they are right; with these last escapements, the ear is not to be depended upon entirely.

In setting your watch to time, be particular to do it as follows:—When the hands set from the front part, which may be known by noticing a square above the minute hand, always set them with the key on the square; never do it by pushing the hands, as in most cases you would break or bend them. In Lepine watches, or in any of those setting from the back, the minute hand is fitted on a round pivot, instead of a square, and by pushing it you would be sure either to loosen, break, or disarrange the minute from the hour hand, so that they would neither perform together, nor point right.

When the hands of a watch set from the back, which can be easily ascertained by there being two holes to the inner back of the case—one to wind the watch, the other in the center for the hands—take your key, and putting it on the square in the center, you then can turn the hands as you wish. But do not open the glass, as, in very flat watches, it will frequently break or fall out, and will cause trouble to replace it.

In independent seconds watches, there are four holes in the back—one to wind the regular time or watch part, one to set it, one to wind the seconds part, and one to set that also.

Many persons think it injures a watch to set it back; it is a mistaken idea, as a watch will not be injured by it unless the pinion which carries the hands turn hard, in which case it would injure it as much to turn it forward as to set it back; and recourse must be had to a watchmaker.

Sometimes the pinions of the hands are too loose, and are too easily moved; the watch will then continue to go, but the hands will not mark the correct time. This can be easily remedied by a watchmaker, who will correct it without taking all the watch apart. Where the case opens at the inner back, care must be taken to close it well, as otherwise the outer back will not shut down properly, and thus dust will be allowed to accumulate in the works.

In English watches, if you have to take off the cap to regulate them, or for any other purpose, in replacing it be sure to put it on straight or flat. I have seen many watches that, by the cap being put on sideways, the chain has been pushed flat on the barrel; the consequence being, that in winding, the chain will either slip off the cone of the fusee, or break. After it is in its place, be sure to fasten it properly by the spring at the top of the cap. If the spring does not hold it down properly, recourse must be had to a watchmaker. If the cap is not properly fastened in its place, the watch will be in danger of stopping by the balance touching it. Sometimes the chain will slip off the cone of the fusee in winding. This is a very bad defect, as the more it happens the more it wears the groove out in which the chain works. In this case, recourse must be had to a watchmaker to correct it, or to put on another chain; at other times, the chains, particularly in cheap work, are too brittle, and continually break. It is useless to mend them. It would be better to put on chains of better quality. The English chains are the best, and not so brittle as the Swiss ones.

Particular care should be taken to keep the works of a watch clean, even though perfectly free from dust; they ought to be taken to pieces and cleaned when the oil has become dry, as, without this precaution, the best watches would be spoiled. They are good watches that will continue to go, until friction and wear prevent their going any longer; they are the most liable to be neglected.

Watches, under ordinary circumstances, should be cleaned every second or third year at furthest. Those that are small and flat, or have complicated works, require cleaning more frequently. Neglect in this particular is the reason why many imported watches are injured by not being attended to in time, and having the oil changed. They may have been made some time previous to being sent out; then the journey here, then from the importers to the dealers, where they may lie for a long time before being sold; so that years may possibly elapse before the wearer has it in his pocket. Therefore, is it to be expected that the watch can perform correctly? If it does, all the time you keep it going, you are only causing it more injury.

No good watchmaker will allow a watch to go too long without changing the oil.

When an accident has happened to a watch, or even if it simply requires cleaning, care should be taken to place it in the hands of an honest and competent workman.

The possessor of a good picture would doubtlessly inquire into the ability of the artist before he entrusted it to him to retouch. This caution is equally necessary for a watch, as many of the best construction have sustained irreparable injury at the the hands of unskilled workmen. Even inferior watches, which are by far the greater number, require the aid of better hands to repair than those that constructed them. A good watchmaker may, in some cases, by judicious alterations, and giving a due proportion, make a watch perform tolerably well, which a bad workman never can do, as he does not understand the principle of the machinery he is working at, and will more frequently make such alterations only to make bad worse.

If the watch does not go its full time, from twenty-eight to thirty hours, there may be some defect in the stop work which prevents it winding up in full, or sometimes the hook at the end of the spring may break and the watch still continue to go for some time after. If the spring is broken toward the center, the watch cannot go; hence the difference. You must apply to a watchmaker, who can soon find out the difficulty. Frequently, after being repaired or cleaned by even the best workman, a watch will, when worn, require a little attention to its regulating. The watchmaker cannot wear all the watches he has to repair; neither can he know the different habits of his customers.

Many persons will say—"I have had my watch repaired, and it does not keep time." It is often an injustice to a good workman who may regulate a watch very closely while in his hands, but when worn by the owner, and the different way in which he uses it, causes it to vary; therefore, it will be necessary to attend to it, and, should it vary, alter it according to the wearer's use of it.

Almost every careful person can regulate his own watch as well as the watchmakers, who frequently alter so many, that they may forget how much and when they altered the regulator of your watch. I have often asked persons when

they wished to have their watches altered, when did you set your watch? The answer frequently is—"I forget exactly; it may be about a week or ten days." In that case, how is it possible to know how much to move the regulator? It is essential, in order properly to regulate a watch, to do it at stated times.

Swiss Regulator.

If your watch is a French or a Swiss one, and loses time move the curb or regulator towards the F or A to make it go faster; if it gains, towards the S or R to make it go slower. These letters are engraved on every French or Swiss watch, F signifying fast, and A advance, and S signifying slow, and R retard, although on most of those made now, they are engraved in full, slow and fast. In English watches with caps, the regulator is either on the cock or on the plate, and you will generally find them engraved on the plates in full—Slow and Fast. Move the regulator but very little at a time, until you get it right, but be sure and set it by the same timepiece, and by one that can be depended upon.

London Regulator.

Liverpool Regulator.

The correct time can always be found at any respectable watchmaker's. If you have moved the regulator or curb as far as it will go, and your watch is not regulated, you must take it to your watchmaker, who will either lengthen or shorten the hair-spring, and put the curb in the center, where it ought to be. A watch regulated to keep time in the pocket, will, when not worn, gain a minute, and perhaps more, per day. The regulator must not in this case be altered, as the watch, when again worn, will lose as much as it had previously gained. Should a watch which has gone well for some time suddenly vary a little, without change in the temperature, the hands only should be set, as the irregularity may have been produced by some external motion.

Few watches are correctly compensated for the effects of heat and cold, and changes of the temperature will produce corresponding variation in the rate of going. If, therefore, a watch has been exposed to a greater degree of heat or cold than usual, the hands may be set to time, but the regulator should not be altered. A watch should be made to go to time at the ordinary temperature of the season. Cold will cause it to gain, and heat will cause it to lose; thus a little attention will enable the wearer to know when it is necessary to alter the regulator.

Should your watch suddenly gain from one to two hours a day, which is sometimes the case after a watch has had some very severe motion, such as a fall, a blow, or a sudden jerk, let a good watchmaker see to it, and he will show you that two turns or coils of the spiral or hair spring have come together between the pins of the curb, and giving the balance a very quick and short motion, has caused it to gain so suddenly.

The same jerk, or falls, etc., may, on the contrary, have caused the spring to get out of the regulating pins, and then the watch would lose considerably. Any honest watchmaker will correct it for you in a few minutes at a trifling charge. But if this defect happens frequently, or a slight jar causes it, there is a defect either in the curb or in the spiral spring, which must be corrected; or, if the curb moves too easily, that, too, must be corrected, as it may be moved by external motion; then it would be impossible to regulate your watch

Watches that stop when being worn, and go on again when taken out of the pocket, without any apparent cause, have sometimes a defect in the escapement which none but a good workman can correct. Another fault with some watches—particularly with cheap ones—is, that the balance is too heavy for the power of the main spring after the watch has gone for some time. The proper manner, and which I consider the only effectual means of remedying the defect, is to lighten the balance and put in a new spiral spring that will regulate the watch. Other means are frequently used, such as new main springs, etc., but, after a time, they will again have the same defect, although frequently, if the main spring is not properly tempered, it will set in the barrel and lose its power. In that case, the defect can be remedied by putting in a good new main spring. I do not by this advocate light balances for good time-keepers. For correctness, they must be as heavy as possible, so that the balance can have a good motion; they regulate better, but all the other parts must be well proportioned, and made on good principles. Some watches, even though uninfluenced by a change of temperature, are liable to a variation from the change of position.

There are some so favorably disposed to their watches as to describe them as keeping time within a minute for months, under all the circumstances of change of place, temperature, and irregular motion. They are excelled by others who say that their watches keep exact time with the sun, notwithstanding its well known irregularity.

Watches have been known to keep their rate for many months, even when subjected to jolting, hard riding, etc., but accuracy under such circumstances is accidental.

The extreme accuracy of marine chronometers is partly produced by their being constantly kept in a horizontal position. Their construction is the same as a pocket chronometer (except sometimes in the spiral spring), from which they differ but in size.

Marine chronometers are only required to show equal time; whether they gain or lose is of no consequence, provided they are regular and keep their rate.

Sir John Herschell has well said: "From the great perfection of the art, we have a right to expect wonders, but not miracles." If, therefore, a watch which measures time from the equal and undisturbed vibration of the balance, were to perform correctly under all the jerks and various motions to which it is liable when carried in the pocket, it would be more than wonderful. Many accidents and unavoidable derangements may happen to a watch, which could not be explained here without extending this essay far beyond its prescribed limits, and which can only be detected by a good and practical workman.

Commencement of the University Law School

The annual commencement of this institution was held on Thursday evening, May 28th, in the chapel of the University building, Washington square, New York city. There was a large attendance, and the proceedings, which consisted of music by Dodworth's band, addresses, and other exercises usual on such occasions, were very interesting and attractive. Among the ten graduates upon whom degrees were conferred by the venerable Chancellor Ferris, were Messrs. A. V. Briesen and W. F. McNamara, employés in the Patent Soliciting Department of this office.

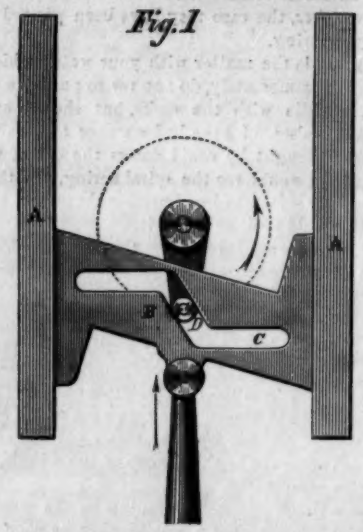
New Method of Converting a Reciprocal or Oscillatory Motion into a Rotary Motion.

Some years since, a gentleman of our acquaintance had occasion to devise some way of converting the motion of an oscillating arm into a rotary motion, and for certain reasons he could make use of none of the known devices. A flywheel was out of the question. The ratchet and pawl movement made too much noise in working. The rotary motion required was very slow, and not desired to be perfectly continuous and uniform, so long as a rotation could be depended upon for each oscillation of the arm.

After much thought he at last invented the movement which we now, with his permission, give to the public, as it may prove a useful contribution to the stock of devices for generating circular motion from reciprocal. The device has been in operation for more than two years, and has been found to answer the required purpose perfectly, the object being to impart to a registering train of clockwork, and to record the number of oscillations of the arm alluded to. The invention has not been patented, and may be used by any one who may find it serviceable.

Fig. 1 is an illustration of the apparatus for converting a rectilinear reciprocating motion into a rotary. A A are guides for the reciprocating block, B, in which is cut the slot, C, in which slides the crank pin, D. The slot is so cut that no portion of its sides can ever be a tangent to the circle described by the crank pin. The directions of the motions of the crank and block are shown by the arrows. If the position of the

Fig. 1

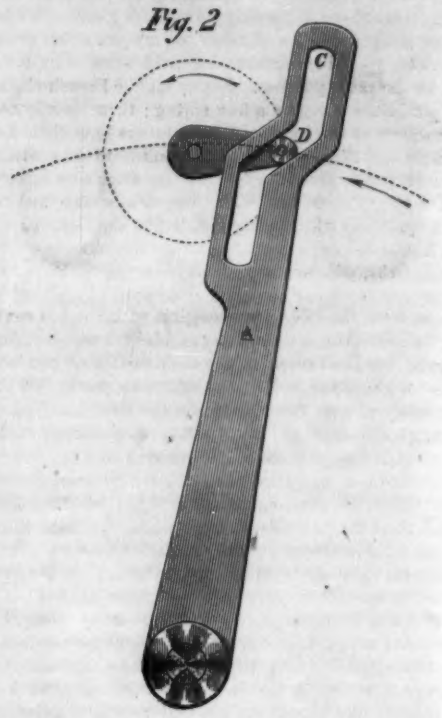


block were reversed, the direction of the rotation would be reversed. To work well in any position, the crank should be balanced so as to have no tendency to turn by its own weight.

By inspection of the figure it will be seen that there is no point in the revolution of the crank where it will not be moved by the motion of the block; that it will pause at the end of each semi-revolution, but that it can rotate only in one direction.

Fig. 2 represents the modification of this device for an oscillating arm. The arm, A, is shown moving in the direction indicated by the arrow at the right of the figure. The crank pin, D, is passing over an inclined portion of the slot; when it has reached a vertical position it will pass down the same side of the slot until the slotted arm has passed through its arc of oscillation, when it will pause at the point, D. When the arm reverses its motion, the inclined plane of the slot opposite D presses upon the upper side of the crank pin, and sliding along it, depresses it past the center. The crank pin passes down the same side of the slot until the crank has assumed a vertical position below its center, then up along the same side again until the arc of oscillation has been again described, when it pauses at the angle, having completed its revolution. To work well, the distance between the center, upon which the oscillating arm performs its motion, and the center of the crank should be at least three times the diameter of the circle described by the crank pin, and the inclined planes of the slot should be in length, at least, about the distance between the center of the crank and the center of the crank pin. The angles included by these planes and the other portions of the side of the slot need to be more obtuse when the oscillating arm is used than when the reciprocating block is employed, at least enough so to bring those portions into planes parallel with a line drawn from the center upon which

Fig. 2



the arm makes its oscillations to the center of the crank pin. When the crank pin is fitted with a friction roller, the movement takes place without noise and without much friction: certainly much less than the ratchet and pawl movement. It also has this advantage over a fly wheel, that it can never permanently stop on the center.

The principle of this movement is, that the force is constantly applied in a line which forms a considerable angle with the radius passing through the crank pin. We have never met with this movement elsewhere, and believe it to be new. Perhaps, at some future time, we may give the mathematical relations which exist between the different parts of the device, together with rules for drawing it so that it shall work with maximum power and with the least possible friction.

A Look into Vesuvius.

At a recent meeting of the Royal Institution Professor Tyndall was invited to state what he saw during his recent visit to Vesuvius, and he stated that he had just returned from Naples, where Sir John Lubbock and himself had been examining the phenomena of the eruptions. The country all round Naples is very smoking and hot, showing the existence of extensive subterranean fires, but they had gained no information of scientific value. On different occasions they ascended the mountain from different sides, and in one instance, when a hurricane of wind favored them, they went further than the guide would lead them, and had a look down the fiery tube of the crater itself. The wind was so strong, that on the way Sir John Lubbock was blown down flat on his face. They also explored some hot subterranean galleries in the side of the mountain, and visited the Grotto del Cano, the well-known cavern, where the floor is covered several feet deep with carbonic acid gas. The heavy invisible gas, in fact, runs out of the cavern in a great stream, and will in the open air put out torches when they are held near the ground. He repeated some of the commoner experiments with the carbonic acid gas, by collecting some in his hat, and carrying it away a litttle distance from the cave, where it was poured over lighted matches, and put out the flame. A little dog is kept near the cave to be half suffocated by immersion in the gas when visitors arrive; and Professor Tyndall protested against the cruelty of the experiment, which, he says, serves no useful purpose, and ought to be stopped.

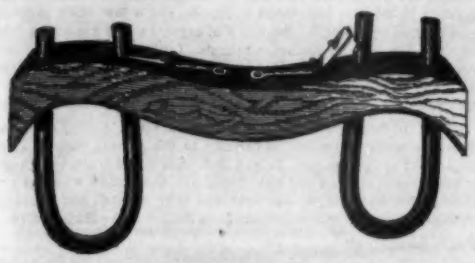
AN English gentleman, by means of a mile of insulated wire, sustained on poles one hundred feet high above the tall trees of his park, has collected, during a heavy fog, enough free electricity from the atmosphere to charge and discharge a battery of fifty jars and seventy-three square feet of coated surface, twenty times in a minute, with a report as loud as a cannon.

THE ear cannot distinguish one sound from another, unless there is an interval of one ninth of a second between the arrival of the two sounds. Sounds must, therefore, succeed each other at an interval of one ninth of a second to be heard distinctly.

IN several mines in Cornwall, England, there are galleries which extend under the sea, where the sound of the waves is clearly heard when the sea is agitated, rolling the pebbles and boulders over the rocky bottom of the ocean.

POST'S IMPROVEMENT IN OX YOKE BOWS.

The mortise through the bow of an ox yoke greatly weakens that part, and the key sometimes gets misplaced and lost, even though attached to the yoke by a leather thong; the thong may break, and just when the key is most needed it is *non est inventus*. To remedy this is the design of the improvement shown in the illustration, patented through the Scientific American Patent Agency Aug. 13, 1867. It is so simple as to be readily understood without extended explanation. Two hinged plates are secured to the top of the



yoke, as seen, the free ends engaging with notches cut in the bow and holding it securely in place until it is forcibly raised by hand. The object and construction of the device is easily understood from the foregoing. For particulars Charles H. Post may be addressed at Guilford, Conn.

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

Pyrites as a Source of Sulphur.

MESSRS. EDITORS:—At present, when, in consequence of the general dullness of business, the price of sulphuric acid is extremely low, it is to be regretted that manufacturers persist in the use of costly, imported brimstone, to the neglect of the excellent and cheap pyrites so abundant in this country. Their case is similar to that of the British chemical manufacturers, who persistently ignored pyrites till compelled to adopt it by the brimstone monopoly attempted by the King of Sicily, but since they have adopted it, find the benefit resulting from its use so great, that every large producer of sulphuric acid in Britain now uses pyrites as the source of sulphur.

During my experience of fifteen years in England, I have used an average of one hundred tuns of pyrites weekly, and had at least twenty different varieties of the mineral to work, and have usually found that each kind required, to some extent, a special mode of treatment to ensure the best results. When pyrites was first adopted in England, this was not understood, and, in consequence, it was no uncommon thing to find from ten to fifteen, and even more, per cent of sulphur left in the burnt ore; but as the subject was studied, and improved modes of burning adopted, this was reduced, till from one to four per cent of sulphur became the range, with an average of two to three per cent in well conducted factories. This point was not reached till much time and money had been spent in experiments, and I regret to learn that one or two manufacturers near New York have lately attempted to burn pyrites with poor success, in my opinion, owing to the to the badly constructed kilns they employed. I have seen a good deal of American pyrites, and have no doubt that those acid manufacturers who first adopt its use will obtain a great advantage over competitors in trade who continue to use brimstone. The proper apparatus for burning pyrites is not very costly, while by using it sulphur may be obtained at from one fourth to one third the cost of sulphur derived from brimstone. The quality of the sulphuric acid produced from pyrites is as good as that from brimstone, provided proper precautions are adopted to separate the arsenic, which may be easily and cheaply done. In short, the numerous objections to pyrites at present urged here, are the same phantoms which formerly haunted British manufacturers, and have been so successfully laid by a closer acquaintance with the subject.

A. G. HUNTER.

Fair Haven, Conn.

Foreign Matter in Wood.

MESSRS. EDITORS:—I have noticed in your publications several interesting facts under the above head, and wish to add two which came to my notice. About sixteen years ago, three English bayonets were found in a tree on Staten Island. The tree was about two feet in diameter, and the bayonets were found nearly in the center, and about five feet below where the body of the tree was forked. About the same time, I saw a musket ball exposed in a pine board. The ball fitted perfectly close, the wood was solid around it, the fiber was not ruptured, neither was there the least sign of it before the board was planed, and it was evident to all who saw it that the ball could not have entered since the board had been cut from the log. The tree from which the board had been cut could not have been less than two and a half feet diameter, and the ball was about eight inches from the center.

J. NADER.

Sandy Hook.

Improvement Needed in Railroad Management.

MESSRS. EDITORS:—Can I say a word about railroads, or is the verdict of a coroner's jury all that can be allowed, however softly worded, against the management of our railroads? Why is it that with all our inventions and improvements looking to the safety of railroad travelers and the property of shippers, the directors of our lines choose to adhere to their old-time and obsolete notions rather than give our inventors and mechanics a chance to help themselves and benefit the public, railroad directors and stockholders included?

It would seem that it would be the part of policy to have such an oversight of a track as to keep the road bed and rails in good condition; and that it would be better to use *good* iron and steel rails in preference to poor ones, even if the former did cost more at first. Do not our railroad companies lose by using heavy locomotives and cars and by drawing almost incalculable loads over their insufficient roads? I think it would be better to employ locomotives of from eight to twelve tuns, with cars corresponding in weight, and smaller trains, rather than to crush the rails with the enormous weight now put upon them.

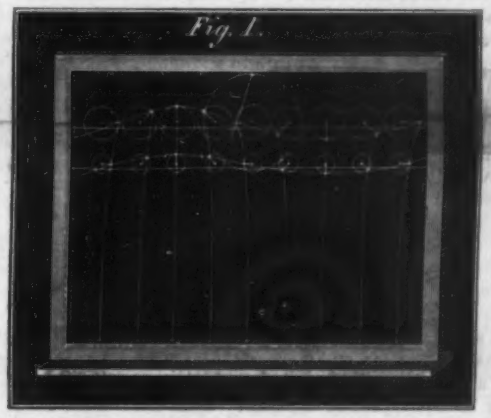
"The times are out of joint." A reform is demanded, or we must all stay at home.

D. P.

The Wave Theory.

MESSRS. EDITORS:—In the *American Journal of Science and Arts* for May, there is a description of a new wave apparatus, invented by Prof. Lyman, to illustrate the modern wave theory, viz., "that in wave motion all the particles of a liquid are revolving synchronously in vertical circles." The author of the article alluded to, states that, "in teaching this theory, however, it is often difficult to make pupils understand how the infinitude of simultaneous revolutions, which it supposes, can take place without mutual interference, and in such a way as to produce the observed phenomena." Now, Messrs. Editors, when I read the last quotation I was glad, for I myself have had difficulty in comprehending the new theory, and I was really beginning to depreciate my own mental capabilities, when this timely paragraph set my mind at rest. There are others who are "at sea" upon this wave theory as well as myself, and I should certainly find some in a New England University who find its comprehension difficult. It is not, then, because I read my *Silliman's Journal* in a shop, or exercise my muscles at the work bench rather than in rowing or at football, that I find difficulty in comprehending the modern wave theory. There seems to be something in the theory itself which *is* difficult to comprehend, and that necessitates the invention of special apparatus.

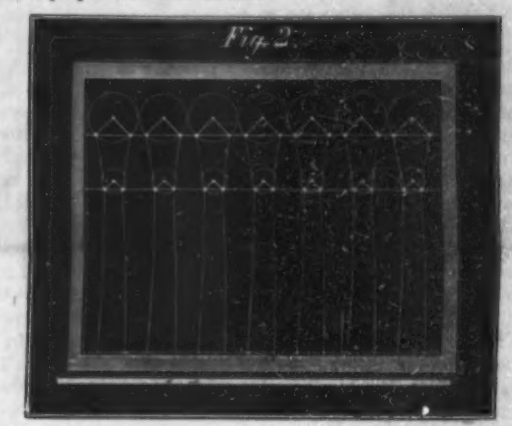
If you will kindly grant me space, I will here transcribe the cut and description of the apparatus from the journal referred to, and afterward explain to you the difficulties which my friends at Yale and Harvard no doubt, in common with myself, find in comprehending it. I am well aware that in your estimation an opinion, provided it be based upon sound logic, is as valuable propounded by a man in his shirt-sleeves, as though he wore a professor's gown. The mechanics esteem you as the champion of practical ideas in America, and no



doubt the *Journal of Science* is the leader of theoretical science on this continent, and we respect it and bow to it as such; but in this case I have found a conflict between the theory and the facts (at least I am so convinced), and my experience has taught me in such conflicts to always stick to the facts.

"In front of a plane surface are two series of revolving arms or cranks, the length of the lower ones being half that of the upper. Two elastic wires connect the crank-pins of each series; upright wires also connect each pair of cranks, and pass down through a plate into the base. The cranks all revolve synchronously; they thus keep their relative position, and come into any given position successively, each in its turn. The relative position of the cranks of each horizontal series is such, that the directions of any two, in regular order, differ by the same fraction of a whole revolution, that the distance between their axes is of a whole wave length. Thus, in the apparatus, the wave length is supposed to be divided into eight equal parts, and hence the common difference between the directions of adjacent crank arms is one-eighth of a circle, as shown in the figure. The cranks in each vertical set have their positions always alike. The number of cranks, whether taken horizontally or vertically, is arbitrary—a matter of convenience in construction. The synchronous revolution of the cranks is effected by means of any suitable mechanism, such as equal toothed wheels on the several axes, with alternate idle wheels connecting them; or, equal rag-wheels, with endless chain, or metallic ribbon; or, equal cranks, with a rigid connecting frame, or plate. The first method is used in the original machine, the third in the model for the patent office, the second and third in the larger and smaller sizes, respectively, for the market.

"The crank pins represent as many liquid particles; the circles on the background their orbits. The transverse wires represent continuous lines of particles, which at rest would be horizontal, and be represented by the lines on the background drawn just below the centers of the orbits; the upper one of these being the surface line, the lower a line of particles one-ninth of a wave's length down. The upright wires represent lines of particles which at rest would be vertical. Every point in these moving lines describes its own distinct orbit. The apparatus is constructed to a scale, and so, represents a wave of given length, hight, and period; but equally represents, also, a wave of any other length and proportionate hight, though of period proper to its length, according to the law of that relation, as stated further on. In the original instrument, for example, the wave length is 36 inches; hight from trough to crest, 4 inches; and period for that length, 0s 76; but it equally represents a wave whose length is 36 feet, and hight 4 feet, with period 2s 63; and similarly for other proportional dimensions."

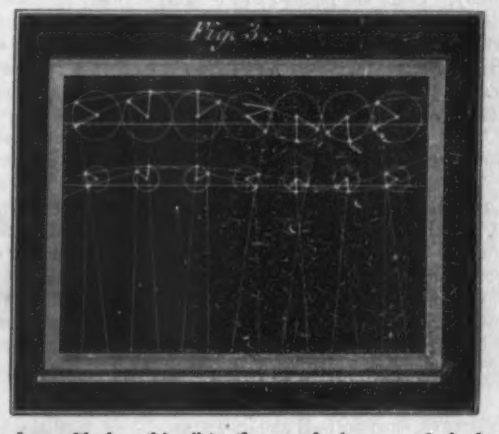


I felt that it was presumptuous in me to entertain a doubt that this apparatus was all that was claimed for it, and that it illustrated so many characteristics of wave motion; but a habit of overlooking authority and thinking for myself (a habit, by the way, which has injured my reputation among the good orthodox people who are my neighbors) led me to examine it, and my examination led to doubts, which my experiments made with a similar apparatus, extemporized for the occasion, confirmed. I give a drawing of the apparatus which I constructed.

Conceiving that the apparatus constructed by Prof. Lyman was deficient, in that it showed only one horizontal and one vertical line of particles traversing the orbits of the particles represented by the crank pins, I made my apparatus with two cranks for each orbit, and connected them with strips of india rubber. I was not surprised when, upon attempting to arrange these cranks as in Prof. Lyman's apparatus, so as to represent the form of a wave, I found the result indicated in Fig. 3.

Clearly a case of interference; one which I could not reconcile with the modern wave theory.

After all, thought I, what is the use of such apparatus, when I can have the "real thing?" If I could only dig a vast pit by the ocean, and erect a shore of transparent glass and look through it at the motion of the water, I might see what the real motion is, and thereupon I set to work to construct an ocean with glass shores. It is eighteen feet in length and 12 inches from shore to shore, and its depth sixteen inches. It was a little more difficult to make a gale of wind; however by the aid of an old blacksmith's bellows, I contrived to simulate all the phases of wind, from the



"zephyr softly breathing" to the steady breeze and the hyperborean blast. In order to enable myself to see the internal mysteries of my ocean, I sought for some fine particles which the eye could easily distinguish, and distributed them pretty uniformly through the water.

Experiment 1.—Steady and continuous but moderate breeze in a direction nearly horizontal upon the surface. Result—A surface current in the same direction as the wind, with undertow in the opposite direction. Current well defined.

Experiment 2.—Steady and continuous but very strong blast, in the same direction. Result—As in first experiment, except that the current was more rapid, and involved more of the mass of the fluid.

Experiment 3.—Sudden gusts at regular intervals. Result—Distinctly marked waves of apparently equal length, except at the extremity opposite the bellows, where the waves were changed into well-marked breakers, upon the vertical end of the tank. Seen through the sides of the tank the particles floating in the water gave no sign of revolution, but danced up and down with the undulations of the surface, the motion growing less toward the bottom, where there was comparatively little motion.

Experiment 4.—Sudden gusts at irregular intervals and of different degrees of force. Result—The waves no longer of equal length, but interfering with and crossing each other, in

the wildest confusion. Particles beneath the surface crossing each other and coming in contact, but showing no sign of revolution.

Now, Messrs. Editors, it may be perhaps justly considered as proof both of my own weakness and boldness, to assert that I do not believe in the modern wave theory, but I have always been so unfortunate as to differ from somebody about something, and having been called by hard names in consequence, have got to be somewhat indifferent to such things. But while writing to you my work has got into arrears, so I will drop the pen and resume my ordinary occupation.

CARPENTARIUS.

Wine Production of the United States.

MESSRS. EDITORS:—The United States pay annually to Europe several hundred million dollars for wines and brandies, which could be made here of as good a quality from the product of our own soil. This is the result of two serious evils in the management of our wine production.

One evil consists in the improper treatment of the wine in the manufacture now prevailing, but which will be corrected by the universal adoption of the air treatment or air fermentation. The other evil is caused by the mistaken notion that the producers of the grape should be also the manufacturers of the wine, and even the dealers in the manufactured article. Nearly all such attempts so far have proved disastrous failures, averted only in few cases by large capital invested, yielding nothing like fair returns. Experience in all branches of manufacture has taught that it is more advantageous to leave the production of the crude material to certain parties, while capitalists undertake the manufacture, and others attend to its exportation to the various markets of the world. This is nothing more than recognizing a proper system of division of labor, the application of which has proved of incalculable advantage to those engaged in the production of grain, sugar, cotton, tobacco, as well as of copper, iron, and other metals. Why should wine be an exception? There should be growers of grapes, as there are of grain, tobacco, cotton, etc., and in the midst of the wine-growing districts capitalists should establish their presses, vats, and stills, purchase the grapes, and dispose of the manufactured article to shippers to foreign ports. The manufacture carried on in this manner will yield certain, fair remuneration to all parties concerned, and steadily increase the profits, which in the present mismanaged way are either reduced to a minimum or, as we have occasion to know, enter on the wrong side of the ledger.

Growers of grapes will cheerfully contract to furnish grapes at the rate of seventy-five cents to one dollar per hundred pounds, equal to a gross yield of about $100 per acre. Manufacturers of wine and brandy, purchasing the grapes in sufficient quantity, may be certain of fifty per cent or upwards per year on the money invested; shippers will find sure profits, and consequently all the parties interested will be benefitted by reducing this branch of industry to a system, unlike what it is at present, always supposing the air treatment is employed, by which the wine is ripe and ready for shipment the same year it is made, and the trouble and expense of storage ripening avoided. Here is suggested an inexhaustible source of wealth, by which the country may be enriched and improved to an extent inferior to that of no other branch of industry. There are planted now upward of thirty millions of vines in the valley and foothill counties of California alone, which this year could produce 15,000,000 gallons of wine under a system as proposed; as it is, the produce is mostly wasted, profitable to none, and rather injurious to the whole country.

The eastern slopes of the Rocky and Alleghany mountains are equally well qualified for wine production, now dormant.

The annual demand for wine, which is not only constant but steadily increasing, would exceed 1,000,000,000 gallons, if it could be supplied, and every sensible man will grant that the United States should cease to import, and rather export, what could as well be produced at home.

Capitalists will find it worth their while to attend to this matter in season.

R. D'HEUREUSE.

San Francisco, Cal.

Replacing Drawn Teeth.

MESSRS. EDITORS:—Noticing an article on teeth in Vol. XVIII., No. 21, induced me to send this. In the year 1853, I had three teeth extracted at the same sitting; the first tooth extracted was sound. At my request the doctor replaced it, and laughingly remarked that it would not take hold, as it was out too long and had become cold, thereby losing its natural heat. I returned home, took the tooth out and again replaced it myself; it remained there until the year 1866, when it became so loose that it was an annoyance to me when eating, and I extracted it. The above are facts.

C. E. WHITMORE.

New Orleans, La.

Use of Old Files.

MESSRS. EDITORS:—In Vol. XVII., No. 20, page 313, is an article on files and the uses to which old files may be put. Allow me to give some of my experience. I am a machinist, but I do mostly brass work; a great many of my tools I make out of old files. My mode of working is as follows: The files must be first annealed from end to end, then they are heated to a very low red heat, then hammered briskly; this flattens the teeth to a thin scale, which each successive heating will cause to peel off. This must be repeated until the file marks are obliterated, when the file can be worked like ordinary steel. By this method I am able to make thin springs from old files and I venture to say you will hardly find a flaw. To grind an old file on the grindstone takes considerable time, especially a small file, and to set apprentices to that work is doing them injustice, for it is certainly teaching them how to work and yet be idle.

WM. TROWBRIDGE.

New Orleans, La.

Divisibility of Matter.

Gold can be beaten into leaves ·00004 of a millimeter thick.

Silver wire, gilded with ·00277 of its diameter of gold, can be drawn so fine that one meter weighs only eight milligrammes. The gold film of this wire is now only ·00000125 of a millimeter thick. By placing a short piece of this wire in nitric acid, the silver core is dissolved out, leaving a tube of gold, having a wall only the ·00000125 millimeter thick. Now under the best microscopes, we can discern a surface of ·00025 millimeter in diameter, and ·0000012 millimeter thick; yet each of these parts has all the physical and chemical properties of a large mass, as can be determined by testing it under a microscope.

Dr. Wollaston drew platinum wire so fine that its diameter was only ·000833 millimeter (·000033 of an inch): and although platinum is the heaviest of the metals, yet it took 200 meters of this wire to equal one centigramme in weight; or, in other words, one mile of this wire weighed about one grain. Dr. Wollaston accomplished this by wire drawing a cylinder of silver ·3 of an inch in diameter, having in its axis a platinum wire ·01 of an inch in diameter, and after having obtained a very fine wire—having in its interior a platinum wire of still greater tenuity—he dissolved with nitric acid the silver coating, and thus obtained an almost invisible platinum wire.

The thickness of a soap bubble, in the dark spot which is formed on it just before it bursts, is ·00001 millimeter.

One grain of carmine tinges ten pounds of water, which we can divide into about 617,000 drops. If we suppose that 100 particles of carmine are requisite to produce a uniform tint in each drop, it follows that one grain of carmine has been divided into 62,000,000 parts.

The thread of a spider is composed of more than 1,000 separate threads.

The diameter of the red disks contained in human blood is ·00025 of an inch; while the diameter of the blood disks of the Java musk-deer is only the ·000081 of an inch, so that a drop of this deer's blood, such as would adhere to the point of a fine needle would contain 150,000,000 disks.

It has been calculated that some of the siliceous plates which cover and give rigidity to the minute vegetable cell-plants called diatomaceæ, weigh only the ·0000000005 of a grain yet the surfaces of these plates are covered with the most exquisite tracery of siliceous stria or bars, often not more than ·0000117 of an inch in width and thickness. Now we can discern a surface of ·0000117 of an inch in the best microscopes, and a portion of one of these silicious disks of that area would weigh only about ·00000000002223 of a grain.

A portion of musk will give off a powerful odor during a year, and yet its diminution in weight has not been sufficient to be detected by the most delicate balance.

"In order to offer an inexact idea of the minuteness of the particles of musk which are still capable of imparting some odor, we state, after a well known experimenting physiologist, that a certain liquid, containing as much of an extract of spirit of musk as ·000000005 part of its whole weight, was at this time still distinctly odorous. A grain's weight of a liquid of which ·0000005 part was of that extract, spread an intensely penetrating odor. Next after musk are to be mentioned certain flower ethers, especially the oil of roses, a little drop of which is sufficient to fill with odor an immense atmosphere. The same physiologist states that a certain space filled with air, of which, at the highest, only ·000001 part was vapor of oil of roses, still diffused a distinct odor of roses."—*Prof. Mayer.*

The Dust Bin.

There is not one particle in the heap the scavenger removes from our houses that is not again, and that speedily, put into circulation and profitably employed. No sooner is the dust conveyed to the yard of the contractor than it is attacked by what are called the "hill women," who, sieve in hand, do mechanically what the *savant* does chemically in his laboratory, separate the mass, by a rude analysis, into its elements. The most valuable of these items are the waste pieces of coal, and what is termed the "breeze," or coal dust and half-burnt ashes. The amount of waste that goes on in London households in this item of coal can hardly be conceived, unless the spectator sees the quantity that is daily rescued in these yards. It may be measured by the fact that, after selling the larger pieces to the poor, the refuse "breeze" is sufficient to bake the bricks that are rebuilding London. Most of the dust contractors are builders as well, and the breeze is used by them for the purpose of imbedding the newly-made bricks into compact square stacks, which are seen everywhere in the suburbs of London. The breeze having been fired, the mass burns with a slow combustion, aided by the circulation of air, which is kept up by the method of stacking; and in the course of two or three weeks the London clay is converted into good building material. Thus our houses may be said to arise again from the refuse they have cast out, and not only are the bricks baked by their aid, but they are built in part with mortar made from the road scrapings, which is pounded granite, and combines very well with the lime and ashes of which the mortar is composed. Nay, even the composition with which some of the smaller houses are faced is very largely adulterated with this particular refuse.—*Quarterly Review.*

MANUFACTURING, MINING, AND RAILROAD ITEMS.

A locomotive designed for the use of the Mount Washington railway, which has been building for four months past, at Franklyn, N. H., is now ready for service. As illustrated on page 145, Vol X., SCIENTIFIC AMERICAN, this engine, in ascending the mountain, is coupled to the rear end of the train, and pushes the cars before it. The boilers of the locomotive are upright, with five hundred square feet of heating surface; cylinders, ten inches in diameter, with sixteen inches stroke; total weight, about seven tuns.

The Nevada papers report that a turquoise mine has been discovered in the Columbus district, and that, in addition to its silver mines, their territory may lay claims to notice for its gem riches. The turquoise, although not strictly a precious stone, is greatly prized as a gem. It is quite hard, and is susceptible of taking a high polish. The choicest specimens are brought from Persia, and are of a sky-blue and greenish color. The occidental turquoise, found in Siberia, Languedoc in France, and a few other places, is either dark, light, or greenish, blue, and is of organic origin consisting, probably, of colored teeth of antediluvian animals. Little attention has yet been paid to this deposit in Nevada, but, judging from the fact that specimens varying in size form a small shot to an almond have been discovered, it is not improbable that a small amount of labor might be generously rewarded.

The rails on the Troy and Greenfield railroad are now laid to Charlemont station, and passenger trains will be running to the Hoosac tunnel, within the time limited by the contract, July 15, 1868. A White Mountain stage contractor has engaged to run a fast line of stages in connection with the railroads across the mountain, in one hour and forty minutes, and an express train will accomplish the whole distance from Boston to the Hudson river in from eight to ten hours.

Several engines, especially designed for running heavy express trains, have recently been put upon the Great Northern Railway of England. These locomotives, drawing a train of twenty heavy English coaches, make the journey between King's Cross and Peterborough, a distance of seventy-seven miles, in one hour and twenty-eight minutes: averaging fifty five miles per hour, although contending with heavy gradients forty miles of the distance. One half this speed per hour is considered very fast traveling on our most level railroads.

The mineral produce of Mexico is remarkable, even when compared with that of the richest countries in the world. Her vast silver resources, however, are yet substatially in a state of embryo, the richest district probably in the republic—Sonora—being almost an unknown land. Mining is carried on in the crudest manner, the natives abandoning operations whenever the water level is reached, preferring the chances of discovering shallow deposits to the more laborious and undoubtedly more profitable explorations in deep mining. Time and experience will remedy this state of tainge, and another half century may find mining enterprise carried on with all the modern improvements and imported mechanical skill.

In 1829, but three miles of railway existed in the United States; to-day, there are 36,500 miles, costing with their equipments and rolling stock $1,700,000,000. If extended in a straight line, the rails would go around the globe more than once and a half times. The passenger cars, if placed in a row, would more than reach from Boston to New Orleans, and they annually carry about 145,000,000 passengers, or four times the entire population of the country, men, women, and children. At the average rate of building for the past thirty years, there are employed some 75,000; in the work of renewal, 145,000 more; and in operating our roads, 200,000 more; making a total of 420,000 men in the railroad business in the United States.

Fast freight cars have recently been transported from New Orleans to this city, a distance of 1,835 miles, in six days' running time. The trip was accomplished at a rate of speed never before attained, but which, with the increased facilities for freighting, and the improvements of the roads, it is expected will soon be greatly increased.

Lead has been found in more than five hundred localities in Missouri; the veins run through twenty counties, and intersect an area of more than 6,000 square miles. The average of assays of ore from all parts of the State, is seventy-five per cent of pure lead. Coal has been found underlying thirty counties of the State, the deposits amounting in the aggregate to 23,837 square miles, with a mean thickness of eight feet. Dr. Litton thinks the iron mountains of Missouri contain enough metal above surface to afford an annual supply of 1,000,000 tuns for two hundred years. The ore is almost exclusively specular, and yields 56 per cent of pure iron, strong, tough, and fibrous. Zinc is very abundant, thousands of tuns being annually thrown away by the miners as a vexatious and worthless impediment to their progress. Copper has been found in fifteen counties, but very little attention has been paid to the zinc or copper deposits, because of the large profits derivable from the working of lead and iron mines. These wonderful facts we gather from a pamphlet on the "Resources of Missouri," just issued by Mr. Sylvester Waterhouse, of St. Louis.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

RING.—Alexander Goodhart, Newvill, Pa.—This invention is a neat and substantial ring or link which can be used in place of a hook for connecting two chains, and, when in place, will present the appearance of a common link.

PROCESS FOR TANNING HIDES AND SKINS.—F. J. Burcham, Racine, Wis.—The nature of this invention relates to an improved process for tanning hides and skins, which cannot be readily described in brief.

TAYLOR'S T-SQUARE.—Daniel Tierney, New York city.—This invention relates to an instrument which is designed to facilitate the drawing of designs upon cloth in obedience to actual or computed measurements.

PRESS.—B. S. Norris, Ripley, Ohio.—This invention consists in providing, in a suitable frame, a vertical presser, which is worked in a downward direction by a ratchet on the same, and a pawl on a lever, which is worked by hand, a spring-holding pawl is also provided for preventing it from sliding backward, and a weight for balancing the same.

WINDING AND SETTING APPARATUS FOR WATCHES.—Louis Victor Piguet, New York city.—This invention relates to a pendant winder and setter, and consists in the use of a key which fits through the pendant, and which has at its inner end a hooked crownwheel that gears into a pinion fitted in the movement; the latter pinion gears into two other toothed pinions, of which one is mounted on a swinging bar, and gears into the barrel ratchet.

ICE CALK.—G. W. Farley, Manchester, N. H.—This invention relates to an improvement in the construction of an ice calk or creeper, and consists in attaching to the device a button provided with a spiral spring, or its equivalent, for holding the button and preventing it from turning when the calk device is in place on the heel of a boot or shoe.

LATHE FOR TURNING WOOD.—A. J. Van Ornum, Hartford, Vt.—This invention consists in providing a sliding sleeve on the mandrel of the lathe, having a square socket in one end, which, in combination with the spurs in the end of the mandrel, serve to hold the shaft of wood while it is being turned from the other end by the sliding tool of ordinary construction, until the said tool comes in contact with the end of the said sleeve, when the latter will be shoved back by the tool, whereby the whole length of the shaft may be turned.

PLOW.—John Koffend, Appleton, Wis.—This invention has for its object to furnish an improved attachment for plows, by means of which the landside of the plow may be adjusted to cause the plow to run deeper or shallower, according to the character of the soil to be plowed, and which shall at the same time be simple in construction, cheap, easily adjusted, and readily applied to any plow, whether new or old.

AGRICULTURAL STEAM BOILER.—Louis S. Robbins, New York city.—This invention relates to improvements in boilers which are used for agricultural purposes, as for steaming and boiling feed for cattle, horses, or other live stock, heating water, and generating steam for other purposes.

FRUIT CAN.—John R. Williamson, Bethlehem, N. J.—This invention relates to a device for holding down the cover of a fruit can and consists of a cam

working in grooves in the sides of the can, and provided with a lever by means of which it can be operated. The grooves in the sides of the can are semi-annular, so that the can can be inserted from either side and applied on either side of the cover.

MITERING MACHINE.—John J. Sanders, Jr., New York city.—This invention relates to a machine for mitering moldings and other articles, and consists in a new manner of combining planing knives with circular saws, so that the edges of the moldings which are being sawed may, at the same time and by the same instrument, be planed.

POTATO DIGGER.—John W. Burnham and Wilson Coulon, Middletown Point, N. J.—This invention relates to a potato digger which is so arranged that the scoop may be placed at any desired angle, and may be raised and lowered at will, inpependent of the frame to which the lower roller, holding the endless apron, is secured, although the latter frame may also also be raised or lowered at will.

PIPE WRENCH.—Nardo F. Loi, New York city.—This invention relates to a wrench which is so arranged that it can be adapted for clamping all sizes of pipe, from the smallest to the largest, and also for clamping plates or other articles of suitable shape. It is in fact a universal wrench, useful in every machine shop, and wherever wrenches are required.

UNIVERSAL HOLDER FOR CARVING MACHINES.—Isaac Hall, New York city.—This invention has for its object to furnish an improved holder for holding the pattern and work for carving machines, designed especially to be used with the improved carving machine patented by the same inventor March 10, 1868, and numbered 75,413, but equally applicable for use with other machines for similar purposes.

AIR-CHAMBERED SHIPPING CASE.—Moses H. Nichols, Hancock, N. Y.—This invention has for its object to furnish an improved shipping case, designed especially for shipping butter and honey, but which may be used with equal advantage for other similar articles.

CONSTRUCTION OF QUILTED SHOES, SLIPPERS, ETC.—Marie L. Hill, New York city.—This invention relates to a manner of constructing quilted shoes, boots, and slippers, and consists in arranging between the filling and outer covering of the quilting a layer of flannel or other suitable material, of the same color as the outer covering. The object of the invention is to produce a shoe which, after the outer covering is worn at some places, will still appear whole, and will not be made useless by the exposing of the generally white filling.

BRICK MACHINE.—John S. Wood, Hartford, Conn.—This invention relates to certain improvements in brick machines, by means of which the pressure upon the clay in the molds can be regulated at will, by means of which the machine can be interrupted at once, whenever desired, without, stopping the motion of the main driving shaft, whereby the grate will be enabled to yield to stones or other obstacles that may project from the molds, and whereby the gate in front of the mold box will also be automatically raised by such obstructions.

WATER WHEEL.—Patented May 5, 1868. Alonzo J. Hall, Derry, N. H.—This invention consists of an inner reacting wheel acting in conjunction with an outer wheel, together with a governor and valve for regulating the quantity and force of water. The inner wheel is constructed with four arms, through which the water is conducted to the outer wheel, where the water issuing from each arm impinges against two of the floats at once, and at such an angle as to produce greater effect than if the whole volume of water were directed against one float at a time. The outer wheel is supported upon a body of water, whereby the friction is greatly reduced, and at the same time the water acts as a lubricant to the bearing surfaces.

HAY FORK.—M. H. Pope, Susquehanna Depot, Pa.—This invention consists of the arrangement and operating devices of the lifting tines, which latter are thrust out horizontally from the main shank and case containing it, through suitable slots.

GAS REGULATOR.—S. F. Mathews, Mechanicsburgh, Pa.—The object of this invention is to provide means for governing and controlling the flow of gas from the main pipe in a house before it is distributed to the burners, and it consists in arranging an adjustable thimble on the end of a gas-pipe nipple, the position of which thimble is regulated by the pressure of the gas, and determines the quantity which is allowed to pass through to the burners.

WINDMILL.—Hiram M. Shaw and Geo. G. Tindall, Fremont, Ohio.—This invention consists in an arrangement for pumping or raising water by the power of the wind, and in controlling that power by the weight of the water so raised, whereby many advantages not hitherto secured by the application of such power are obtained.

GLOBE AND CHECK VALVE.—John B. T. Van Patten, Sing Sing, N. Y.—This invention relates to an improvement in globe valves, whereby they are made to operate as check valves.

WOOD CLEAVER.—John Van Winkle, New York city.—This invention relates to an improvement in implements used for splitting the wood used in cities and other places for kindling fires, and for other purposes.

BROOM HOLDER.—F. B. Batchelder, Prairie du Chien, Wis.—The object of this invention is to furnish a cheap and convenient article for holding brooms, mops, brushes, and other articles of a similar nature, and for household or other purposes.

SAFETY VALVE.—F. Harden, Conshohocken Pa.—This invention relates to an improvement in safety valves, whereby they are made much more sensitive and sure in their operation than those hitherto in use.

BRICK MACHINE.—Lewis M. Vansickle, Woodbridge, N. Y.—This invention relates to a machine for molding and pressing brick, tile, etc., and it consists in a new and improved construction of the scraper of the mud mill, whereby the scrapers are rendered less liable to break than those of ordinary construction. It consists in a peculiar mechanism for molding, pressing, and discharging the bricks, whereby said work may be rapidly performed, and in a perfect manner.

SEEDING MACHINE.—E. P. Harris, Connesutville, Pa.—This invention relates to a machine for sowing seed of various kinds, and may be adapted for planting potatoes. It consists in a peculiar construction of certain parts, whereby an exceedingly simple and efficient device for the purpose specified is obtained.

HAND AND BENCH DRILL.—Charles G. Miller, Brattleboro, Vt.—This invention relates to a hand and bench drill, and consists of a peculiar construction and arrangement of parts, whereby an exceedingly convenient and desirable article for the purpose specified is obtained.

SAWING MACHINE.—James R. Logan, Rolla, Mo.—This invention relates to improvements on cross-cut sawing machines, and is more especially designed to be applied to a machine of that kind for which Letters Patent were granted to this inventor Dec. 19th, 1865. It consists in a novel manner of applying the wheels, on which the machine is mounted to the axle thereof, whereby they may be adjusted in a plane parallel with the log, to ensure the ready adjustment of the saw to the log, after each cut. It also consists in an improved means for surpending the saw, or keeping it in an elevated state when the machine is not in use, or is being drawn from place to place.

CORN PLANTER.—W. R. Clark, Indianola, Ill.—This invention consists in certain devices which conduce to a more perfect and satisfactory operation in planting corn or other grain of similar character.

NECROSETER.—Mary E. Mott, Rouses' Point, N. Y.—The object of this invention is to preserve a corpse from decomposition before burial. It consists of a rubber case or envelope for holding ice, and is provided with a discharge tube of the same material for conducting off the water as the ice is melted. It is filled with ice and laid upon the abdomen of the corpse, and a tube conducts the water from the sack into any suitable vessel.

HOSE.—Edwin M. Chaffee, Providence, R. I.—This invention consists in the employment of Grenoble hose as a means of sustaining the pressure of the water within the waterproof or inner hose. The two hose being cemented together by rubbery by a suitable process.

PLOW.—Gabriel Utley, Chapel Hill, N. C.—This invention has for its object to furnish an improved plow so constructed and arranged that the moldboard and point may both be detached from the plow when desired and so that the said parts may not be weakened by having bolt holes formed in them.

CONVERTING CAST IRON INTO WROUGHT OR MALLEABLE IRON.—Alexander Lisk, Philadelphia, Pa., and Adam Woolever, Allentown, Pa.—This process consists in commingling with melted cast iron certain chemical substances, which, being decomposed by the intense heat of the iron, produces the requisite chemical change and quality in the latter which is known as malleable or wrought iron.

COOKING STOVE.—B. Newbury, Coxsackie, N. Y.—This invention has for its object to improve the construction of cooking stoves so as to make them more convenient in use.

ANIMAL TRAP.—John C. McClamrock, Edina, Mo.—This invention has for its object to furnish an improved self-setting animal trap, which shall be simple in construction, durable and reliable, which will require little attention, and with which any desired number of animals may be caught without the trap being visited.

FOLDING STOOL.—W. E. Cameron, Green Island, N. Y.—This invention has for its object to furnish an improved folding portable stool, so constructed and arranged that it may be folded into a very neat and compact form for storage or transportation.

BILL POSTER.—A. H. Faizinger, Washington, N. J.—This invention relates to a device for securing bills in position or holding them against a wall or other fixture. The invention consists of a series of clips, of peculiar construction, attached to a cleat which is nailed or secured to the wall or other fixture, so that the upper end of the bill may be readily inserted in the clips and retained or held thereby.

GRATE BAR.—Henry King, Waterbury, Conn.—This invention relates to a method of constructing the grate bars of furnaces, fire boxes, etc., whereby air is more freely admitted to the burning fuel.

TAPE BOX.—A. J. Fellows, Meriden, Conn.—This invention relates to the catch by means of which the drum of the box having the tape wound around it, is held or released, as may be desired.

GAS APPARATUS.—James McClelsh, New York city.—This invention relates to a gas apparatus for lighting steamboats, railway cars, and other conveyances and movable structures. The object of the invention is to obtain a means for the purpose specified, which will be compact, so as not to monopolize much space, efficient in its operation, and, especially as regards pressure, simple in construction, and not liable to become deranged by use.

SURCINGLE.—Stephen Hyde, New York city.—The object of this invention is to provide a surcingle or girth for horses, which will yield sufficiently when the animal breathes, or lies down, or exerts himself in any unusual manner. It consists in the inter position of two rubber straps or joints on each side of the buckle, these joints being sewed to the ends of the girth or surcingle and to the buckle strap. The tongue strap is sewn to the other rubber joint in the same manner, and the joints are inclosed in leather sheathes for protection.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at $1 00 a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

G. W. A., of Mass.—Excellent emery wheels which may be used with water, as are grindstones, are made by dissolving gum shellac in alcohol, mixing the emery with it and pouring and pressing in molds. Good wheels may also be made by a mixture of glue, dissolved, and emery, treated in a similar manner. Ordinary wheels are made by covering the periphery of a wooden disk, suitably secured to a mandrel, with folds of woolen or Canton flannel, and covering the whole with leather or strong cloth. Upon this is placed a coating of emery secured by glue.

P. B. C., of Ind.—For car or other axles plumbago—black-lead—mixed with the oil prevents heating and insures smoothness of rotation.

J. E., of Mass.—This correspondent is entirely mistaken in supposing that we ridicule what are called spiritual manifestations. But before we open our columns to the discussion of this subject we wish to see some evidence that it may be "made useful," as our correspondent seems to think. We are always ready to advocate and present the useful, but not to devote the columns of our paper to discussions annoying to most and valuable to none of our readers.

W. P. H., of Mass., asks "why are the cones of fly frames convex and concave? Some contend that straight cones will produce the same result, which is not correct. I think the necessity for this form is because of the position the belt is inclined to occupy, in changing places on the cones." We were not aware that cones were so made, but if so it is evident the concave cone should be the driver and the convex the driven, as a belt will always seek the highest place on the pulley face, as is well known.

S. A. M., Jr., of Pa.—"Can you give me the titles of works or papers on aluminum?" We cannot. Better refer to D. Van Nostrand, corner of John street and Broadway, New York city, or to H. C. Baird, 406 Walnut street, Philadelphia.

E. H. C., of Iowa.—Kalsomining is simply a species of distemper painting, the ingredients being whiting, glue, and water, with such colors added as will give the required tint, if any but pure white is desired.

J. H. M., of L. I.—"Is there more power gained by a long belt than a short one? What shall I put on leather belts to keep them soft? What is the best work on stationary engines?" A long belt adheres with more force to the face of a pulley than a short one because of its superior weight. As long belts may be run slacker than short belts, millwrights and mechanics prefer a considerable distance between shafts driven by belts running from one to the other. Neatsfoot oil is the best softener and preserver of leather belts with which we are acquainted. "Bourne on the Steam Engine," and "Bourne's Catechism" are among the best treatises on the subject. Castor oil is perhaps the best oil for greasing belting; see Vol. XV., p. 357.

J. K. P., of Miss., asks what is the best water wheel for a small stream, one that will give the most power, suitable for a corn mill. He says, "I have a small stream that will afford a body of water only three feet wide, and three inches deep, with six feet fall; what is its power with the best wheel, and what the cost of the wheel?" The proper persons to refer to in regard to power and cost of wheels are our advertisers. H. C. Baird, Walnut street, Philadelphia, will furnish you with the latest edition of Fallett's "Miller and Millwright" and D. Appleton & Co., New York city, will furnish their encyclopedia.

J. P., Jr., of R. I.—We are not responsible for the published opinions of correspondents. The information you seek can undoubtedly be obtained by addressing the writer of the article to which you refer.

A. N. C., of Mass.—Rubber does not dissolve easily enough to give you a varnish by simply placing it in a bottle with the solvent. Ether is one of its regular solvents, but then it must be real ether and not the mixture of ether and alcohol which is sold for ether in many drug stores. It also must be pure rubber, and not the sulphur-vulcanized article; then this pure rubber must be cut into small pieces, soaked in the ether in a warm place for about twenty-four hours until they are swollen up, and then it must be kneaded in a mortar. In such a way rubber varnishes may be made and are made even with common benzine.

R., of Md.—Your method of covering glass with a crystallization of some salts of course is old, as you suggest. Salts of soda absorb too much the moisture and therefore will not last. Sulphate of zinc is better, to be dissolved in some gum water, which is as good or perhaps better than beer.

J. R. N., of Pa.—That your fruit did not keep in glass jars with "thin corks" as well as in tin cans with "tin covers" is very natural. Sealing with wax even does not make a cork proof against the penetration of oxygen when it is dry; therefore wine bottles must lay down and a champagne or beer bottle kept in a position that the cork remains dry, they will surely be spoiled in a week even with the best style of corking. For fruit even the inversion will not do, as all air must be prevented from coming in contact with the liquid even in the pores of a cork.

W. H. G.—Tobacco ashes would be good for manuring soil where tobacco grows, only they cannot be obtained in sufficient quantity; they are also recommended for tooth powder, and sometimes contain small quantities of the rarer new metals, rubidium and cæsium. We have in our possession a bottle with pure white salt, crystallized out of a lye made from tobacco ashes sent us by a correspondent. However we do not know any use for it.

H. M., of S. C., sends us a few algebraical problems with the answers and partial solutions, and states that he will "disclose them in full, for an adequate remuneration;" we do not feel inclined to pay a man for solving his own puzzles.

S. S., of Ind.—Lemon juice may be preserved by making an almost saturated solution with sugar; likewise all other extracts of fruits. It is, in fact, the way by which all the flavoring syrups for soda water are preserved. Flavoring extracts are preserved by the addition of a small quantity of alcohol.

W. C. W., of Ala.—Rubber coming in contact with fruit in air-tight preserving jars may in some cases communicate its peculiar odor to the fruit; the fruit will not lose on the rubber, but it must be kept in view that all soft rubber in the course of time (some years) always becomes rotten, in fact oxidizes by atmospheric influences.

P. C. D., of Pa.—The latent heat of vapors of different liquids has been determined by Andrews, Despretz, Favre, and Silberman. (See Quart. Jour. Chem. Soc., Vol. 1, p. 27). Brix found that for water, alcohol, ether, and turpentine, the latent heat of the vapors was for equal weights respectively 1000, 420, 194, and 167, and the specific gravity of these vapors is as 0·45, 1·26, 2 23, and 5·2, the latent heat for equal volumes therefore is 900, 635, 599, and 890. Alcohol therefore contains the greatest amount, and ether the least amount of heat for equal volumes, of course under the ordinary atmospheric pressure. (The boiling points are 212°, 173°, 95°, and 315° respectively.) For all these reasons vapor of ether is theoretically the most economical and several years ago a large ether engine was built and experimented with at the Novelty Works, New York city; practical difficulties, however, caused the utter abandonment of this principle.

T. W. B., of Ky.—A very good white soft metal that may be rolled into sheets is that used for the plates music is engraved upon, and may serve your purpose; it is an alloy of block tin with 10 per cent of antimony.

Business and Personal.

The charge for insertion under this head is one dollar a line.

For breech-loading shot guns address C. Parker, Meriden, Ct.

For Improved Lathe Dogs and Machinists' Clamps, address, for Circular, C. W. Le Count, South Norwalk, Conn.

Brick Machine.—Lafler's New Iron Clad has more advantages than any other ever invented. For descriptive circular address J. A. Lafler & Co., Albion, Orleans county, N. Y.

Wickersham's American oil feeder—the best and will lead. For proof, see advertisement.

See Wheeler & Wilson's buttonhole attachment, making one hundred buttonholes an hour. The desideratum for families, dressmakers, and manufacturers. No. 625 Broadway, New York.

Mill-stone dressing diamond machine, simple, effective, and durable. Also, Glaziers' diamonds, and for all mechanical purposes. Send stamp for circular. John Dickinson, 64 Nassau st., New York.

Funston's electric toy.—See advertisement.

Wanted—the address of plow makers everywhere. Address J. E. Jinkins, Milton, Fla.

Wanted—a practical brass cock maker—to conduct and take an interest in the brass finishing business. One that can furnish from $1500 $2000. Good reference required. For full particulars address postoffice box 446, Richmond, Va.

Wanted—Wood-working machinery. Illustrated priced lists of wood-working machinery, such as for making buckets, chairs, bedsteads, etc. Also, spoke and hub lathes, and bending fellies, shafts, plow handles, etc. And a steam engine, with and without boiler, about 13-in dim. and 30 in. stroke, and a muley saw mill. Address A. B., Columbus, Ga.

Employment for all at $5 50 to $8 75 per day. Send two stamps to P. & K., Box 2259, Cincinnati, Ohio.

Lubricators for valves and cylinders, Broughton's are far the best. Made by Broughton & Moore, 41 Center st. They make, also, the best gage cocks.

Two valuable patents for sale—now in successful operation, and sold only to close an estate. Inquire of S. N. Muir, 128 Waverly Place New York.

All genuine Bartlett sewing machines are provided with a guarantee bearing the trade mark and signature of J. W. Bartlett, the patentee, from the depot, 569 Broadway, New York. Beware of bogus machines and agents.

Winans' Boiler Powder (11 Wall st., N. Y.) A positively uninjurious remedy for incrustations. 13 years' references. Beware of frauds.

NEW PUBLICATIONS.

ATLANTIC MONTHLY. Ticknor & Field, Boston.

The June number is issued, and the subjects of the writers are treated in the masterly manner which characterizes most of the articles in that journal but the subjects lack the usual interest. Price $4 a year; 35 cents for single numbers.

EXTENSION NOTICES.

Daniel Halladay, of Batavia, Ill., formerly of Ellington, Conn., having petitioned for the extension of a patent granted to him the 29th day of August, 1854, for an improvement in governor for wind mills, for seven year from the expiration of said patent, which takes place on the 29th day of August, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 10th day of August next.

Abner Whiteley, of Springfield, Ohio, having petitioned for the extension of a patent granted to him the 23d day of August, 1854, and reissued the 8th day of January, 1856, for an improvement in track clearers to grass harvesters, for seven years from the expiration of said patent, which takes place on the 23d day of August, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 10th day of August next.

Phillippine S. Brackenridge of Natrona, Pa, administratrix of the estate of Edward Steiren, deceased, having petitioned for the extension of a patent granted to the said Edward Steiren the 12th day of December, 1854, for an improvement in process of treating the mother-water of salines, for seven years from the expiration of said patent, which takes place on the 12th day of December, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 16th day of November next.

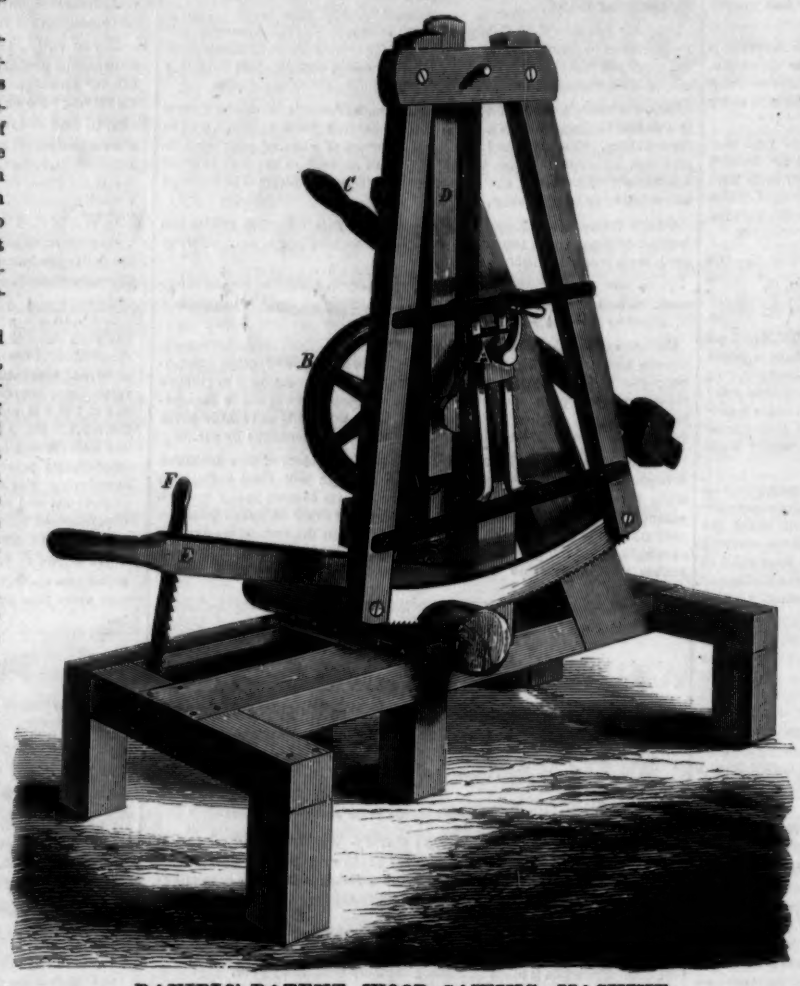
Improved Hand Sawing Machine.

No labor is more exhaustive to the wind or requires more monotonously muscular exertion than that of sawing wood for fuel by the old-fashioned buck saw. It may be excellent exercise for those of sedentary habits and others of a dyspeptic tendency, but we never heard of any one choosing the wood sawyer's as his vocation, however agreeable it may be to officiate as a "wood sawyer's clerk." The inventor of the machine shown in the engraving evidently agrees with us, as he has constructed a neat and portable machine, which, if it does not make wood sawing a pleasure, greatly diminishes its labor.

The machine is a frame with a braced upright, to the top of which is pivoted a segmental swinging frame, holding between its lower ends a curved saw plate. The movement of the frame and its saw is like that of a pendulum, and it is produced by a handle attached to the wrist pin of a crank, which pin carries a sliding box traversing between vertical slides the length of which is equal to the full stroke of the crank. The shaft that carries the crank has on its other end a balance wheel to equalize the reciprocatory motion of the saw.

In the engraving, A is the sliding box and handle, and B the balance wheel. The lever, C, is for elevating the saw and its appurtenances by means of a sliding bar, D, traversing between two uprights. This lever is weighted at the end opposite the handle, C, by a weight that may be moved toward or from the center to act as a means of forcing the saw into the wood. The bar, E, with the toothed catch, F, is intended to hold the stick or log while being sawed.

This simple machine will saw wood much more rapidly and with less labor than the work can be performed by hand, and it is cheap and durable. It is the subject of a patent obtained through the Scientific American Patent Agency, dated Nov. 6, 1866, and an application for improvements is now pending. Further information may be obtained by addressing H. A. Daniels, at Thomaston, Conn.



DANIELS' PATENT WOOD SAWING MACHINE.

Burying Alive.

A method for determining when death has taken place without that of actual decomposition, which in very cold weather might be delayed for weeks, has always been a desideratum. The fear of being buried alive, which has undoubtedly occurred in many instances, has proved a source of anxiety to persons during life and of sad conjecture to their surviving friends. It is said that it has been recently discovered that if the skin of a deceased person is blistered, as by holding the flame of a candle against the body, when punctured the blister will give out only air, whereas if death has not taken place the flame causes inflammation and a watery serum will be deposited under the blister. It is claimed that this is a certain test when inability to feel the pulse, cold skin, no deposit of breath on glass, and other methods fail.

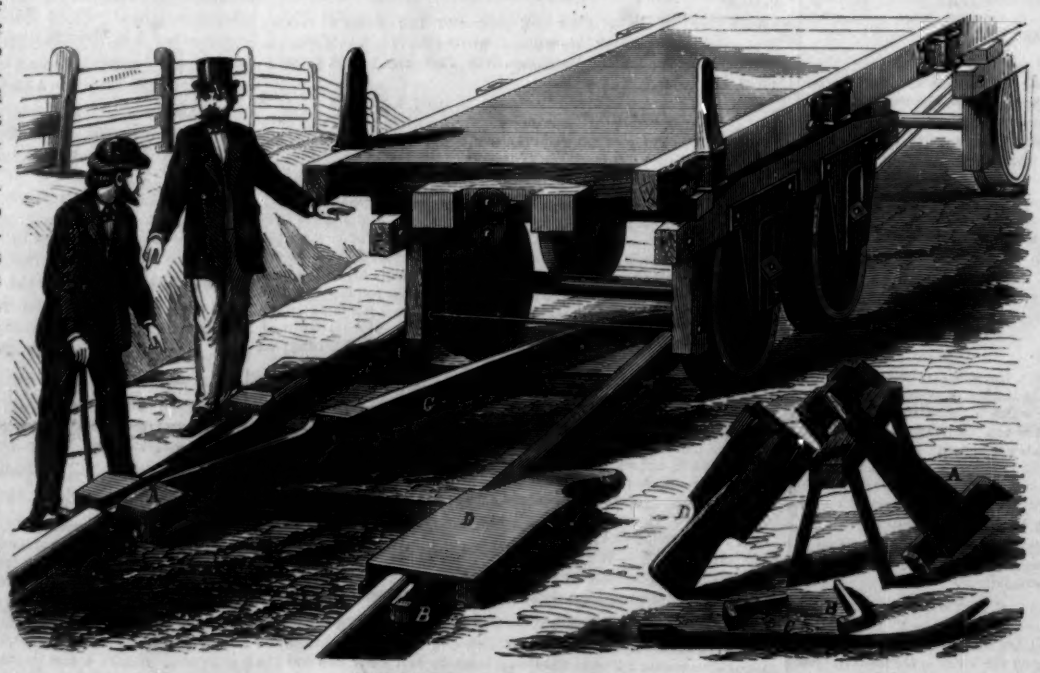
Device for Replacing Cars on the Track.

Notwithstanding the frequent accidents from the displacement of locomotives and cars from railways, the use of the jack screw and frequently other less mechanical and still cruder means are employed to replace them. Even the former is not always carried on the train, and the latter demand the oversight of some well balanced and executive mind to make their use effectual. A portable and convenient device for remedying the annoyances attending these almost unavoidable accidents seems to be really a desideratum. It would seem that the one repre, sented in the engraving accompanying this article was well fitted to answer this want.

The pieces to be used are only three in number, and are not so heavy but that either of them can be readily carried by one man. They consist of a grooved plate, A, with side projecting flanges to slip over the rail and to be held in place by means of wedges, or keys, B, fitting between the flanges of the plate and the web of the rail. This plate has a gradually opening or expanding groove, guarded on each side by flanges. It is so constructed that from the forward end it declines to the road way, forming an easy incline for the wheels of a car. To further assist the car in its progress to the track, a bar, C, is used, one end of which fits in a proper socket in the plate, A, and the other end of which is curved so as to fit either one track or the other, as the run-off cars may be. It can be easily reversed so as to suit either contingency.

On the other side of the road, or on the other rail is placed a curved plate, D, secured to the rail as the plate, A, is, by a key or wedge, which assists the wheel of the car to assume its normal and proper position. These comprise all the appliances of this device. They are simple in construction, can be easily carried on any engine tender or street car, and the pieces composing them can be readily handled by one man in case of accident. It will be seen that while the flanged incline, A, pilots the flange of one wheel to its position on the rail, the other is assisted to its place by the smooth incline, D. The device is as well adapted to street cars as to steam cars. It is recommended by Franklin Peal of the Baldwin Locomotive Works, Philadelphia, Robert H. Sayers of the Lehigh Valley Railroad Co., and other prominent engineers and railroad men.

It was patented through the Scientific American Patent Agency, April 14, 1868. Railroad companies and others desirous of purchasing rights may address B. K. Jamison, 301 Chestnut street, Philadelphia, Pa.



JAMISON'S CAR REPLACER.

Vitality of Insects' Eggs.

The Troy *Times* says: "A gentleman who lives on Ida Hill informs us that ten years ago he bought a piece of enameled cloth for a table cover, on which there was at that time and has been ever since a small knot or bunch, apparently in the make of the cloth. A day or two since a child of his scraped the bunch with a knife, when out crawled a bedbug, as lively as ever."

This case may be a remarkable one, but newspaper men and dealers in paper will not hear of it with much surprise. The *Cimex Lectularius* or common bedbug is very tenacious of life, as all our neat housewives know. He will stand boiling water, oil, soap, and even some of our patent bug destroyers, and rather seems to enjoy his rough treatment, as we superior animals enjoy the rough usage of the Russian bath. But his embryo offspring seem to be still more tenacious of life. Some years ago, in writing on unprinted news paper, we detected a bunch which occasioned some annoyance, as such an obstruction will to a writer, and opened it with the point of a pen, when a veritable *cimex* made his appearance, apparently as fresh as though he had just awaked from a long winter nap. Subsequently, under similar circumstances one fairly cut through his paper envelope and walked out before our eyes. In both cases the enveloping film of paper appeared to be whole, and we could not resist the conviction that the embryo had passed through all the stages of the paper manufacture—the sorting and washing of the rags, their grinding, steaming, pulping, manufacture into paper, calendering, and putting up for the market.

A New Life Saving Invention.

Last summer public interest was excited in watching the success of two trans-Atlantic excursions undertaken by certain foolhardy individuals who were willing to stake their lives against a short-lived notoriety. It having been demonstrated that the ocean passage can be made in an ordinary sail boat, or raft, with a fair share of safety, we should not be surprised if some future adventurer desirous of creating a sensation and rendering himself famous in this line, should undertake a trip, or rather swim, to Europe, the feat being possible with the life-saving apparatus of Captain Stoner, exhibited in this harbor on the 27th ult. The apparatus, whose design is for service in case of shipwreck, consists of an india-rubber suit, in one piece and made large enough to put on over the ordinary clothing of the wearer. The buoyant power resides in a cork jacket worn inside the rubber suit. A covered framework fastened to the hands furnishes propelling or swimming device, and a light metallic case serves as a reservoir for provisions, holding enough food and water to last for a month or more. The trial on Wednesday was under the auspices of the National Life Saving and Ship Ballasting Company, who chartered a government steamer for the occasion. Two persons dressed in this suit remained in the water for nearly two hours without wetting their clothing in the slightest degree.

The apparatus is somewhat similar in construction, and for the same purpose, as an india-rubber suit with an air bag on the back, making the wearer when in the water, resemble a porpoise, which was exhibited by the inventor in our harbor several years ago, much to the amusement and consternation of great numbers of persons who gathered upon the docks to witness the exploits of the exhibitor. Similar apparatus has been experimented with on the Continent for a number of years, but we have never known of their useful application except for wrecking purposes.

Petroleum in Parliament.

The English journals notice the introduction of a bill into parliament imposing additional restrictions upon the sale and use of petroleum. The bill—which by this time has undoubtedly become a law—while serving as an amendment to what is known as the Petroleum Act of 1862, is still more stringent in its provisions, and virtually puts an end to the sale of all lamps using the light hydrocarbons, and also the various styles of portable illuminating-gas machines which have proved themselves of great service in many localities in this country, but of whose value, it seems, the Britons are never to be acquainted. The test for lawful petroleum is placed, by this bill, at one hundred and ten degrees Fah., the commercial test for kerosene in this country, and any person selling, or exposing for sale, oils giving off inflammable vapors below that point, is subjected to a fine of five pounds sterling. Venders of "patent non-explosive oils" will not find much encouragement for driving a very extensive trade in England.

THE French towns of Narbonne and Passy, near Paris, have been lighted at night, for several years past, by illuminating gas made by passing the vapor of water over incandescent coal.

Scientific American.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY AT
NO. 37 PARK ROW (PARK BUILDING), NEW YORK.

O. D. MUNN, S. H. WALES, A. E. BEACH.

☞ "The American News Company," Agents, 121 Nassau street, New York
☞ "The New York News Company," 8 Spruce street
☞ Messrs. Sampson Low, Son & Co., Booksellers, 47 Ludgate Hill, London, England, are the Agents to receive European subscriptions or advertisements for the SCIENTIFIC AMERICAN. Orders sent to them will be promptly attended to.
☞ Messrs. Trubner & Co., 60 Paternoster Row London, are also Agents for the SCIENTIFIC AMERICAN.

VOL. XVIII., No. 24....[NEW SERIES].. *Twenty-third Year.*

NEW YORK, SATURDAY, JUNE 13, 1868.

Contents:

(Illustrated articles are marked with an asterisk.)

*Improvement in Molding and Pressing Bricks 369
Mind and Charcoal 369
Pomades and Oils 370
The Clock—How to Use It 370
*The Watch—Its History and Manufacture 371
Commencement of the University Law School 372
*New Method of Converting a Reciprocal or Oscillatory Motion into a Rotary Motion 372
A Look into Vesuvius 372
Post's Improvement in Ox Yoke Bows 373
Pyrites as a Source of Sulphur 373
Foreign Matter in Wood 373
Improvement Needed in Railroad Management 373
*The Wave Theory 373
Wine Production of the United States 374
Replacing Drawn Teeth 374
Use of Old Files 374
Divisibility of Matter 374
The Dust Bin 374
Manufacturing, Mining, and Railroad Items 374
Recent American and Foreign Patents 374
Answers to Correspondents 375
New Publications 375
Extension Notices 375
*Improved Hand Sawing Machine 376
Burying Alive 376
*Device for Replacing Cars on the Track 376
Vitality of Insects' Eggs 376
A New Life Saving Invention 376
Petroleum in Parliament 376
No Limit to Invention 377
Wind Wheels—One of their Adaptations 377
Rouge—Its Composition and Uses. 377
To Deposit Copper, Silver, or Gold by the Electric Battery on Paper and other Fibrous Material 377
An Electrical Thermometer 377
To the Disciples of Icarus 377
Meteors and Comets 377
A New Telegraph Patent for Old Inventions 377
First Attempts to Propel Vessels by Steam 378
Wages Before the War and Now .. 378
Twin Screws 378
Patent Claims 378, 380, 381, 382
Inventions Patented in England by Americans 383

NO LIMIT TO INVENTION.

That the mechanical arts have reached a very advanced stage of improvement, as compared with their status in medieval ages, cannot be denied. How far modern civilization, dependent upon progress in those arts, exceeds that of a more ancient period, is a difficult question to answer satisfactorily. The remains of Egyptian, Roman, and Greek architecture, together with such knowledge as can be gathered from a few Latin and Greek writers, and the discoveries recently made in the excavations among the ruins of Herculaneum, indicate that in many things the ancients were not inferior to us of the present day, while in others they probably possessed knowledge that was superior to that at present possessed upon the same subjects. The arts of stone cutting, fresco painting, and sculpture, the mathematics, and speculative philosophy, were cultivated by them with great success. Could the books and manuscripts lost in the wanton destruction of the Alexandrian library be restored, there is no doubt that many mathematical theorems and mechanical devices, considered as belonging to the present age, would be found to have their prototypes in the ages whose records were lost in that ever to be lamented conflagration.

However, it may not only be fairly presumed that we have regained the greater portion of the art knowledge of the past, but that we have explored vast fields of knowledge, the very existence of which was not even suspected by the ancients. As progress in the sciences has been made, the scope of mechanical invention has been also enlarged, until the number and variety of machines which have been produced, and applications of substances discovered in chemical research to the supplying of the necessities and luxuries of mankind, are beyond computation.

The questions naturally arise, how much further the inventive powers of the human mind can find scope; whether there is not a limit to progress in mechanical construction; or if not limited by want of materials, or subjects upon which to operate, whether the constant increase of labor-saving machinery, and the increasing supply of fabrics, will not at last reach a point where the wants of the human race will be so fully supplied that demand will cease, and thus, the necessary stimulus to further attempts at improvement no longer existing, the epoch of invention will not forever terminate. The discussion of these questions forms the subject of the present article.

The development of new resources is constant and increasing. Chemical research is being almost daily rewarded by important discoveries which add to the already vast resources of materials available for mechanical purposes. To the ordinary observer, it might seem as though these resources were sufficient already; but to show the fallacy of such an opinion, we will state a few of the wants now seriously felt in the mechanical arts, and the supply of which would give a powerful impulse to invention:

A substance perfectly flexible, impermeable to fluids or gases under heavy pressure, and not acted upon chemically by ordinary substances in general domestic use, oils, liquors, etc. A substance which can be produced in large quantities at a cheap rate, of as low a specific gravity as the body of a goose-quill, and with equal strength, that shall be easily molded into required forms. A substance having, or capable of having imparted to its surface as smooth as the surface of water at rest. A method of producing the galvanic current in large quantity, as cheaply as heat is obtained from the combustion of coal. We might enlarge the list greatly, but our object is simply to illustrate the fact, that extensive as the mechanical resources in material might seem to be at first glance, there are still many deficiencies to be supplied.

That these deficiencies will be supplied we have not the slightest doubt, and their discovery will commence a new era in hydraulics, aerostatics, photography, and the construction of electro-motive engines. But could all such requirements be placed at once within our reach, we should find that in their utilization new and hitherto unsuspected necessities would arise for other materials and processes, which would in their turn become objects of research for the chemist or the metallurgist. Such discoveries would give rise to numerous inventions developed by the same gradual march of improvement that has characterized the history of the steam engine, navigation, and other departments of mechanical engineering.

Nor is it probable that the wants of the human race will ever be so completely supplied that demand for improvement will cease. Man, in a state of barbarism, has but few wants except those possesses in common with the animal creation. As he advances in the scale of civilization his wants increase in a far greater ratio than his progress. He is no longer an animal, satisfied with sufficient food, and warmth, and rest; his mind and affections begin to assert themselves, and to not only modify those wants which are purely physical, but to create new ones. Even if man could for a space find his every desire completely satisfied, the craving for variety, which is an attribute of the human intellect, would create new desires, and novelties in dress, in food, in amusements, would become not certainly essentials to his existence, but most surely they would be necessary to a refined and cultivated existence. "The eye is never satisfied with seeing, nor the ear with hearing;" and this universal truth is a sufficient guarantee that while skill can supply it shall always find a demand for its products.

WIND WHEELS—SOME OF THEIR ADAPTATIONS.

It is somewhat surprising that while in other countries the wind mill, or wind wheel, is extensively employed to save the labor of man and beast and the eating expenses of the steam engine, there are so few of them used in this country as stationary motors. No one, not even those who make its manufacture or sale a specialty, pretend that it can supersede either the steam engine or water wheel; but they claim, not without reason, that where neither of the others are available, or where the expense of their establishment and care precludes their employment, the wind wheel may be economically used. Our western prairies afford no water powers, and as they are not overburdened with fuel, the use of the steam engine is almost interdicted. In this respect parts of Holland and Belgium resemble these portions of our own country, as they are level and not wooded, but the wind mill is a prominent feature in the landscape. It is so also in other parts of Europe.

The wind wheel is not well adapted to such mechanical work as requires a steady, uniform motion, owing to the variable and unreliable character of the power; although it has been and still is employed to run the stones for grist mills. But for some of the services needed on the farm, especially for pumping water for cattle and for household use, it seems to be admirably adapted. It would appear, also, that while the wind wheel can elevate water for domestic or irrigating purposes, or for the draining of mines, it might be employed to produce a reservoir of that fluid to be used on a small turbine or water motor, to give motion to a sewing or knitting machine, a loom, or churn, and for various other purposes that will readily suggest themselves. Its first cost is light and its after management requires but little care.

ROUGE—ITS COMPOSITION AND USES.

In the mechanical arts rouge is used for polishing purposes. It is entirely different from the cosmetic known by the same name, which is a vegetable preparation and used only for the complexion. But the rouge used by machinists, watchmakers, and jewelers is wholly a mineral substance. In its preparation crystals of sulphate of iron, commonly known as copperas, are heated in iron pots, by which the sulphuric acid is expelled and the oxide of iron remains. Those portions least calcined, when ground, are used for polishing gold and silver. These are of a bright crimson color. The darker and more calcined portions are known as crocus and are used for polishing brass and steel. For the finishing process of the specula of telescopes, usually made of iron for large instruments—although lately cast of steel—crocus is invaluable; it gives a splendid polish. Lord Rosse prefers for the production of rouge the peroxide of iron precipitated by ammonia from a dilute solution of sulphate of iron, which is washed and then compressed until dry. It is then exposed to a low red heat and ground to powder.

To Deposit Copper, Silver, or Gold by the Electric Battery on Paper and other Fibrous Material.

The whole question is to make the paper a good conductor of electricity without coating it with a material which may peal off. One of the best methods is to take a solution of nitrate of silver, pour in liquid ammonia till the precipitate formed at first is entirely dissolved again, and place the paper, silk, or muslin for one or two hours in this solution. After taking it out and drying well, it is exposed to a current of hydrogen gas, by which operation the silver is reduced to a metallic state, and the material becomes so good a conductor of electricity that it may be electroplated with copper, silver, or gold in the usual manner.

An Electrical Thermometer.

One of the most interesting adaptations of electro-magnetism is an English invention for making electricity in connection with a thermometer regulate the temperature of a room. An ordinary mercurial thermometer is provided with a platinum wire connecting with the mercury in the bulb. Through the other end of the tube is inserted another platinum wire capable of being elevated or depressed. These two wires are in connection with the poles of a battery, and in the circuit is an electro-magnet whose armature controls the opening or closing of a valve for the admission of hot air. If it is desirable that the temperature of the air should not rise above sixty degrees Fah., the free end of the movable wire is brought to the required number on the tube. When the heat is such as to cause the mercury to rise to that degree, the electro circuit is completed, the armature closes the hot-air valve until the temperature is diminished, when the circuit is broken, and the valve again opened.

To the Disciples of Icarus.

From the number of letters received elaborating various plans for navigating the air, we are aware that there is a large class of our readers who are intensely interested in aeronautics, and for their benefit we announce the prizes to be awarded by the English Aeronautic Society at their approaching exhibition in the London Crystal Palace:

For the best form of kite or other aerial contrivance for establishing communication between ship and shore in the case of a wreck, or between two vessels at sea, $250.

For a machine whatever may be its motive power, which shall sustain itself in the air at a hight not less than ten feet from the ground for a period of twenty minutes, $250.

For an apparatus (not a kite or a balloon) that shall ascend with a man to the hight of 120 feet, $500.

For the lightest engine in proportion to its power, whatever the power may be, $250

Competition is free for citizens of every nationality, and let our boasted ingenuity display itself to the amusement and gratification of our British cousins.

Meteors and Comets.

Professor Pepper, in his Lenten Lectures on "physical astronomy," at the London Royal Polytechnic, stated that fourteen years ago, Dr. Bedford discovered the relation between meteor and comet, and announced their actual identity; that at the time, and long since, it was regarded as mere theory; but within the last two years astronomers have proved the truth of Dr. Bedford's discovery, which was made by a careful comparison of recorded phenomena from the earliest times. The Professor said that it had been proved by five mathematical elements of the orbits of five several comets and meteors, and that the discovery is regarded as one of the grandest additions to astronomical science; and stated that Dr. Bedford has propounded entirely new theories of astronomy, which are most profound and very interesting, and well worthy of being studied.

A NEW TELEGRAPH PATENT FOR OLD INVENTIONS.

In March last an act was passed by Congress and approved by the President authorizing the issue to Charles Grafton Page of Letters Patent for alleged inventions in the science of electro-telegraphing, the position of Prof. Page as Examiner in the Patent Office disqualifying him from either taking out a patent or acquiring any interest therein without special legislation. Prof. Page died on the 5th instant, but prior to his decease, under the pretended authority of this law, a patent was granted to him which virtually hands over to his representatives the whole control of American telegraphy, entirely ignoring the claims of other recognized inventors, and taking from the public, rights they have enjoyed for years by the expiration of former patents. The heirs of Prof. Page now step in and insist upon securing to themselves the profits promised by this singular law.

The direct claim of Professor Page, as set forth in the law, was for the invention of the induction-coil apparatus known among telegraphers as the Ruhmkorff coil; but the patent covers much more than this. It embraces the "employment of one electro-magnetic instrument to open and close the circuit of another electro-magnetic instrument, using either one battery for both or separate batteries for each," which is, in fact, the famous "local circuit" years ago patented to Prof. Morse; the "combination of an automatic or mechanical circuit breaker with either a primary coil alone or a primary and secondary coil combined," invented and patented by Royal E. House; the "employment of separate and independent batteries to operate an electro-magnetic circuit breaker and the circuit which is broken by it," which is the famous "repeater" patented by Mr. Hicks; and, indeed, covers all automatic closers, repeaters, local circuits, and all points of value known in the electro-telegraph business.

The bill and the patent founded upon it are outrageous impositions upon the public, and will not for a moment stand the test of the courts. It is singular that Prof. Page's name should never have been known and associated with these important inventions, and that as Examiner of Patents for many years he should have passed favorably upon the claims of those who have secured patents for these very discoveries, which he afterward claimed to have originated with himself. The Morse and House patents have expired long since, and by limitation of law their inventions have for years been public property. The Hicks patent has yet some years to run. The truth is, the bill bears upon its face evidence of having been the work of lobby legislation, and the patent is glaringly absurd, unjust, and illegal. We understand that an effort is being made to induce some of the telegraph companies to buy up the pretended rights of Prof. Page's heirs; but we advise them to keep their money in their pockets and to take no notice whatever of the claim. The passage of such a law shows how careless and stupid our legislators at Washington have become since the small amount of brains they possess has been muddled up by impeachment, and the best thing

they can now do is to repeal the act and take care that they are not hoodwinked into such absurd legislation in the future.—*N. Y. Herald.*

[In connection with this subject we present a letter written by Prof. Page, only a few months before his decease, to the editor of the London *Scientific Review*, in which he frankly admits that priority of invention in respect to the circuit breaker belongs to Prof. McGauley.—EDS. SCI. AM.]

Prof. Page, of the United States Patent Office, in a pamphlet recently published on the history of the induction coil, shows clearly, by documentary and other evidence, that Ruhmkorff has no claim whatever to any merit in respect to the invention of the coil which bears his name. Not only were all the principles on which the action of the coil depends, discovered long before Ruhmkorff embodied them, but even the details of the apparatus had all been invented and described, and not only so, but a complete, nay, a more powerful apparatus, had been made and exhibited in Paris. This apparatus was constructed by an American, Mr. Ritchie, who modestly attributes its merits to the researches and discoveries of Faraday and others, who had made electro-magnetism their study. It was exhibited in Paris to many scientific men, and was actually taken to pieces by M. Ruhmkorff, an instrument maker, so that its construction might be thoroughly understood. A few years afterward M. Ruhmkorff obtained the Imperial Prize of 50,000f. awarded by a commission of men eminent in science, to the author of the most important discovery concerning the applications of electricity. Among the members of this commission were gentlemen who had seen Mr. Ritchie's coil, but who found it convenient to forget it. The French journals awarded to Ruhmkorff all credit for the invention, and refused to publish explanations of the real facts of the case, forwarded to them from scientific gentlemen in America. Du Moncel, Ganot, and other French writers on the subject of this invention, though they were all fully conversant with the truth, and though some of them were present at the experiments with Ritchie's coil, and even at its dissection, have carefully ignored any apparatus of the kind as a competitor in merit with Ruhmkorff's.

In pleasing contrast to conduct like this, we turn to Professor Page's frank and honest acknowledgment of merit to those who had anticipated himself in some very valuable inventions relating to induction apparatus. Among the gentlemen credited with such inventions, the late Professor McGauley, who was so long connected with this journal, and whose recent death created so much and so well-merited sympathy among scientific men, is prominently mentioned. We remember that on several occasions Prof. McGauley mentioned in his modest, unassuming way, that he had invented what was called the Ruhmkorff coil, but we never had an opportunity of ascertaining the details of his claim. Now, some months after his death, information comes to us across the Atlantic, which connects his name with the history of induction apparatus, for it appears from the evidence furnished by Professor Page, that Professor McGauley was the first to invent and apply the automatic contact-breaker, the type of all now employed in such apparatus. A coil fitted with such a contact-breaker, was exhibited by Prof. McGauley, at the meeting of the British Association in 1837, and a description of it was published in 1838, among the proceedings of that body. It appears that Prof. Page, who was himself engaged in working out induction apparatus, independently invented a similar but more complete contact-breaking apparatus early in 1838, having had no information as to McGauley's invention. Yet Prof. Page, with the true modesty of science, frankly awards to Prof. McGauley all the honor of priority in this matter. Not only so, but having heard of that gentleman's death, and of the exertions made on behalf of his bereaved widow and children, he has written to Sir David Brewster, the chairman of the McGauley Memorial Relief Fund, the following letter, which we now publish, and which will be read with the melancholy interest attaching to all connected with the great name of him, now no more, to whom the letter was addressed:—

UNITED STATES PATENT OFFICE, Feb. 6th, 1868.

DEAR SIR:—Noticing the death of Professor McGauley, mentioned in the *Scientific Review*, I take the liberty of sending you a book on Induction I have recently published, in which I have had occasion to make honorable mention of his name, in connection with an invention of interest and importance, of which he was undoubtedly the originator. The hammer circuit-breaker, which has been so extensively used in connection with Induction Coils all the world over, has been in England, France, Germany, and Europe, generally a tributed to Dr. Neef, of Frankfort-on-the-Main. In this country it has always been accredited to me, as I invented it at least six months in advance of its introduction by Dr. Neef. My investigations, however, have traced it to Professor McGauley as the original author, and it appears to me somewhat singular that Dr. Golding Bird omitted to mention the originator's name when he brought the apparatus before the London Electrical Society. He simply said "it was not his own invention." It cost me a considerable search to find it out, but I have proceeded upon the principle of according to every inventor and discoverer his just dues, regardless of personal and national considerations. If this discovery in his favor should be of any benefit in raising means for his family, I shall rejoice and feel proud that my humble efforts to do justice to a co-laborer in the cause of science have met with such a reward.

With great respect and esteem, I am, very respectfully, yours,

CHARLES G. PAGE,
Chief Examiner of Patents.

Sir David Brewster.

SINGULAR ROBBERY.—Recently, at Seymour, Ind., while a railroad train was stopping to take in water, a gang of robbers took possession of the engine, tender, and Adams' Express car, detached them from the train, and started off down the track. The engine and car were found abandoned next day, standing on the track about eighteen miles from Seymour. The robbers threw the express agent out of the window and rifled the Adams' Express safes of over fifty thousand dollars in money.

THE object glass in the great refracting telescope at Cambridge, Mass., with a clear aperture of fifteen inches, cost unmounted about $15,000. A French artist employed in a Birmingham (Eng.), glasshouse, has succeeded in making a disk of flint glass twenty-nine inches in diameter, two and a half inches thick, and weighing two hundred pounds.

Science Familiarly Illustrated.

First Attempts to Propel Vessels by Steam.

Before Fulton made his successful steam voyage on the Hudson others had conceived the idea, proposed plans, and in some cases tested them. Pepin, Savery, the Marquis of Worcester, and Dr. John Allen, of London, all had proposed, prophesied, or tried steam navigation. The device of using wheels instead of oars, the propelling power being men or animals, is believed to have been employed by the Egyptians and Romans in their war galleys.

In 1737 Jonathan Hulls published a pamphlet describing a method of propelling a vessel by steam, for which he had secured a patent. He proposed placing the wheel at the stern, that being the proper place for it because water fowl pushed their web feet behind them. In 1786 Benjamin Franklin, and also Oliver Evans, suggested the action of steam upon a column of water, forcing it out of the boat at the stern on a line with the keel, the water having been received forward. This plan has many advocates at the present day, and a modification of it, but really the same in all essential respects, has latterly excited considerable attention in England.

About the same time this plan was tried by Mr. James Rumsey, of Sheppardstown, Va., who made a public experiment on the Potomac. His boat was about eighty feet long and was propelled by a steam engine working a vertical pump in the middle of the vessel, by which the water was drawn in at the bow and expelled through a horizontal trunk at the stern. She went at the rate of four miles an hour when loaded with three tuns in addition to the weight of her machinery, one third of a tun more. The whole machinery, including boiler, occupied a space but little over four feet square.

John Fitch, in 1786, made a number of experimental excursions on the Delaware with a boat propelled by paddles worked precisely as those of an Indian canoe. The following is Mr. Fitch's account of it: "The cylinder is to be horizontal, and the steam to work with equal force at each end. The mode by which we obtain what I term a vacuum is, it is believed, entirely new, as is also the method of letting the water into it, and throwing it off against the atmosphere without any friction. It is expected that the cylinder, which is of twelve inches diameter, will move a clear force of eleven or twelve hundred weight after the frictions are deducted; this force is to be directed against a wheel of eighteen inches diameter. The piston moves about three feet, and each vibration of it gives the axis about forty evolutions. Each evolution of the axis moves twelve oars or paddles five and a half feet; they work perpendicularly, and are represented by the strokes of a paddle of a canoe. As six of the paddles are raised from the water, six more are entered, and the two sets of paddles make their strokes of about eleven feet in each evolution. The crank of the axis acts upon the paddles about one third of their length from their lower ends, on which part of the oar the whole force of the axis is applied. The engine is placed in the bottom of the boat about one third from the stern, and both the action and reaction turn the wheel the same way."

In 1796 Fitch moved a small boat on Collect Pond, in New York city, by means of a small engine and propeller screw projecting from the stern of the boat. This is probably the first employment of the screw for propulsion.

The *Charlotte Dundas* was built by Symington in 1801 and used to tow boats on the Forth and Clyde canal three and a half miles per hour. Its use was abandoned from a belief that the action of the wheels washed the banks.

Oliver Evan's dredging machine, built by order of the Board of Health of Philadelphia, being a flat scow with a small steam engine on board for working the mud-raising machinery, propelled itself one and a half miles on wheels to the Schuylkill, and then, by means of a stern paddle wheel, navigated the river to its junction with the Delaware.

We come now to Robert Fulton whose claim to have been the first to successfully introduce steam navigation as feasible and profitable cannot be successfully disputed, although steam for propelling vessels had been used before his first trial on the Seine and his subsequent triumphant demonstration on the Hudson. Reigart, the author of the "Life of Robert Fulton," justly says, "he never attempted to put in practice any improvements in mechanics without having made his calculations, drawn his plans, and executed his models. None of the projectors prior to him, whose claims have been set up to rival his, have left any traces of calculations, or even an account of the principles upon which their machines were contrived. They were among the multitude that thought steam might be applied to navigation. They went to work to form a machine, with a crude notion that it might do something, without having attempted to calculate what, and without any precise plan for its execution; when it did not answer their expectations it was abandoned, because they could not perceive the cause of its failure or any mode of improvement upon it."

Fulton succeeded because he knew what he was about. He was a thorough mechanic, a good draftsman, a practical workman, a studious and careful thinker, and a man of persistency. When, in the spring of 1803, he had completed his trial boat on the Seine, and in a gale it sunk before the trial could be made, he went to work to recover such portions of the wreck as might be made valuable, and succeeded in the ensuing August in making a trial before the members of the French National Institute. This experiment so encouraged him that he ordered an engine from Messrs. Watt & Boulton, of Birmingham, to be built and shipped to him in America.

In 1807 his boat was launched, and in September of the same year the *Clermont* made her first trips between New York and Albany. From this time forth inland steam navigation was an established fact, and ocean navigation is only an extension of the same principle.

Wages Before the War and Now.

Among all classes of workingmen in the city the subject of wages is attracting a great deal of attention. With the revival of business much complaint has been made that the pay of mechanics is inadequate for their support, since it has not kept pace with the increase in rents and other expenses of living. In order to show whether or not this is really the case, we present the following comparison between the wages and expenses of workingmen in 1861 and at present, compiled from accurate sources:

WEEKLY WAGES IN NEW YORK.

Class of work.	1860-61.	1868.
Bakers	$10	$12
Coopers	9	24@27
Blacksmiths	12	18@20
Carpenters	10@12	21@24 50
Cabinetmakers	6@ 7	21
Iron molders	12@15	21
Boiler makers	10	12@18
Machinists	10@14	12@18
Engineers	9@12	18@25
Plasterers	9@10	27@30
Masons	9@10	27@30
Ship carpenters	12@15	21@24
Laborers	7	12@15
Tin workers	9@10	15
Longshoremen	25c. per hour.	40c. do.
Tailors	8@14	14@20
Printers	15@18	22@25
Painters	12@15	24
Tin roofers	12	24

Other rates might also be given, but the above are sufficsent to show the general average. It will be seen that while in some trades wages have more than doubled, in others they have remained almost stationary. The pay of bakers, machinists, and boiler makers, for example, is almost the same as before the war; while that of masons, plasterers, and others, is nearly three times what it then was. In the mean time, the cost of living has advanced immensely. Clothes and provisions have doubled in price, and board and lodging also. Before the war, a single man could get board for $2.50 to $4 per week, where he would now have to pay $5 to $7. In more costly premises the increase is not so great, as some allowance is made for the greater security and regularity of pay. A floor now renting for $16 per month, could have been leased in 1861 for $12. The mechanics, also, who occupy these places, are those whose compensation has most largely advanced, and therefore they suffer less than their poorer paid associates. It is to be hoped that employers will take the whole subject of wages promptly into consideration, and that as soon as business is fairly under way, some general movement will be made toward equalizing the pay of workmen with the increase of their expenses.—*N. Y. Sun.*

For the Scientific American.

TWIN SCREWS.

The practice of propelling vessels by the combined action of two screws, placed one under each counter, has of late received considerable attention. Some of our monitors, and also a number of small vessels, have been fitted with this mode of propulsion, and in most cases the result has been satisfactory.

The twin screw possesses many advantages over the common screw. Steering is facilitated, as the rudder acts upon steadier water, and in cases where the rudder is damaged in such a way as to make it useless, the vessel is as capable as ever of continuing her voyage. So great is the power of the double screws, when working in opposite directions, that a vessel fitted with them is enabled to turn almost or quite within her own length. A great advantage is the recovery, in part, of the power expended by the screw in its centrifugal action upon the water. If two vessels be tied stern to stern, one propelled by a common screw, and the other by paddles, the screw vessel will in all cases tow the paddle vessel astern against the full power of her engines. This is explained by the fact that the screw, in its centrifugal action, heaps up a bank of water at the stern, which bank, acting against the vessel, pushes her forward. This shows that under certain conditions the power expended in raising the bank of water can in part be recovered. But when a screw vessel is going through the water at her usual rate, she runs away, as it were, from the bank of water at her stern, and its effects are but slightly felt. As fine pitches, and quick speeds of the propellers, are generally to be found in vessels having negative slip, it is natural that we should in part impute the existence of such slip to the centrifugal action of the propeller, for a fine pitch propeller acts so rapidly that the vessel is unable to run away from the wave.

From what I have stated, it is easy to see how part of the power of the screw lost by its centrifugal action, is recovered. Now, if this be the case, as it certainly is, the twin screw system is admirably adapted for the partial recovery of the power lost by the screw in this way. With a twin screw, the bank of water is raised forward, well under the counter, and is enabled to act with full force on the sloping surface of the run, and thus have a great effect in forcing the vessel forward. Great as the advantage is, it has one serious drawback, and that is, twin screw boats lack the power possessed by a common screw in backing. The only reason I can assign for this lies in the fact that the screw raises the same bank of water in backing as in going forward, and that this bank exerts a great force against the retrogressive motion of the ship. The water, as it is heaped up, meets the flare in the vessel's sides, which enables it to act against a more perpendicular surface. How much this disadvantage of twin screws is to influence their general adoption, remains to be seen. For many purposes, especially in light draft ships, the advantages of the double screw counterbalance the objections, and they are introduced with a good result. Many vessels, especially those not used for towing, are not called upon to exert a great force in backing, having only their own momentum to overcome.

ENGINEER.

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office.

FOR THE WEEK ENDING MAY 26, 1868.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ *Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to Inventors, may be had gratis by addressing MUNN & CO., Publishers of the Scientific American, New York.*

78,173.—CAR COUPLING.—J. W. Adams, Spring Creek, Wis.

I claim the arrangement of the lever, h, and rod, j, with the pin, C, and spring, D, when constructed as described and operated by the link, D, secured substantially as set forth and for the purposes specified.

78,174.—RAILROAD CAR VENTILATOR.—M. Christopher Andrews, Lawrence, Mass.

I claim the arrangement of the hinges of each two consecutive shutters of a series thereof, so that such two shutters shall open in opposite directions, as explained, and the combination therewith of mechanism as specified, or its equivalent, whereby such shutters may be operated in manner as set forth.

Also, the combination or mechanism for operating shutters, arranged as specified, such consisting of the slide bar, H, and its operative lever, I, or the equivalent thereof, a series of slotted and bent levers, F, and their connecting links, the whole being arranged together substantially as explained.

Also, the arrangement of my shutter-operating mechanism with the inner surface of the shutters and the side of the car, whereby such mechanism is all brought within the car when the shutters are closed.

78,175.—LOCK SNAP HOOK.—Wilber F. Arnold, New Britain, Conn.

I claim the lock thumb latch, d, with the latch, c, and hook, b, substantially as and for the purpose described.

78,176.—WRENCH.—Joshua B. Barnes, Fort Wayne, Ind.

I claim the combination of the jaws, A and B, straps, C C, and spiral spring, F, arranged and operating as and for the purposes set forth.

78,177.—TABLE LEAF SUPPORT.—Elwin E. Berry, Farmington, N. H.

I claim the combination of the lever catch D, or its mechanical equivalent, with the arm or strut, B, and the staple, C, so as to operate therewith as described, when they are applied to a table or other like article, substantially in manner as specified.

78,178.—CARPET-CLEANING MACHINE.—Geo. W. Bishop (assignor to Lafayette Farrington), Stamford, Conn. Antedated May 12, 1868.

I claim, 1st, in a carpet-cleaning machine, the arrangement on a divided shaft of the brooms, J J', operating substantially as herein specified.

2d, The weighted beaters, b c, attached to and in combination with the roller, H, when arranged spirally around said roller, substantially as herein specified.

3d, The arrangement and combination of the rollers, C F G E, for feeding, guiding, and winding up the carpet, in combination with the beaters, b c, and brooms, J J', substantially as herein specified.

78,179.—STEAM ENGINE PISTON.—Cornelius Bollinger, Harrisburg, Pa. Antedated May 14, 1868.

I claim the conical nut, H, constructed with a female screw on the inside, to fit the piston rod, and male screw on the outside, to fit the piston head, in combination with the piston head and rod, as described.

In combination with the conical nut, H, provided with lugs, I I, the corresponding lugs on the head of the cylinder.

78,180.—LANTERN.—Thomas H. Brady, New Britain, Conn.

I claim a lantern guard having the upper and lower rings, or either of them, made of cast metal, as described, as a new article of manufacture.

78,181.—HAY AND STRAW CUTTING MACHINE.—Chas. Brown, Buffalo, N. Y.

I claim, 1st, The combination of the cutting and crushing mechanism, substantially as described, and for the purpose set forth.

2d, The combination of the cutting and cleaning mechanism, substantially as described and for the purpose set forth.

3d, The vertical cleaning chambers, with air apertures in the front and back sides thereof, and exhausting fan combined therewith, substantially as described and for the purpose set forth.

4th, The dividing and separating plate, L, arranged in the manner and for the purpose set forth.

5th, The feed table, G, constructed and arranged as described, for the purpose set forth.

6th, The rotary feeder, K, arranged and operating as set forth.

78,182.—PROCESS FOR MAKING TRANSPARENT SOAP.—Morgan W. Brown, New York city.

I claim the means and mode of treating and settling a soluble hard soap, as herein described, to render the same transparent, substantially as specified and set forth.

78,183.—HARD DRILL.—Wm. C. Burch, Gloucester, N. J.

I claim the combination and arrangement of the helical brake with the drill shaft and the head of the operative lever, the whole being to operate substantially as described.

78,184.—BED BOTTOM.—Wm. A. Chamberlin, Alexander, N. Y.

I claim, 1st, The hinged levers, B B, supporting cross pieces, C C, india rubber blocks, s s, and slats, A A, arranged and operating substantially in the manner and for the purpose set forth.

2d, Hinging the ends of the levers to the cross piece by means of hook or eye bolts, f, and extended key rod, g, in the manner and for the purpose shown and described.

78,185.—GAS APPARATUS.—C. H. Childs, Cleveland, Ohio.

I claim, 1st, The perforated tubes, H, surrounded with textile or fibrous material, and chamber, C', in combination with the chamber, E, and annular space, F, substantially as and for the purpose specified.

2d, The pipes, M N, and chamber, C', in combination with the diaphragm, G, annular chambers, C, and cover, D, arranged as and for the purpose set forth.

78,186.—CULTIVATOR.—Charles A. Cogswell, Maquoketa, Iowa. Antedated May 12, 1868.

I claim the attachment of the curved rod, A, to the standard and beam of the ordinary shovel plow or cultivator, in the manner and for the purpose above specified.

78,187.—WASHING MACHINE.—Thomas Crane, Fort Atkinson, Wis.

I claim, 1st, The construction of the oscillating cradle with a bottom, c, which is independent of the tub, in combination with the stationary partition C, arranged with said cradle, substantially as described.

2d, The cradle, constructed with a bottom, and with its back board closed, and its front board perforated, in combination with a perforated removable partition, C, arranged within the cradle, but connected to the outer tub, substantially in the manner described.

3d, The cradle having a bottom and ends substantially as described, and a top which is hinged and fluted or roughened on its under surface, in combination with the board, A', of the tub, substantially as described.

78,188.—RAILROAD CAR.—Martin M. Crooker (assignor to himself and Azro B. Allen), Rutland, Vt.

I claim a rail-car in which its doors are flexible, and are arranged to pass up under the roof and over one another, substantially in the manner and for the purpose described.

8,189.—LUBRICATING COMPOUND.—T. E. Curtiss, Titusville, Pa.

I claim the within described lubricating compound, composed of the materials and substantially in the proportions set forth.

78,190.—EYE GLASSES.—Albert H. Daniels, Hartford, Conn.

I claim, 1st, The spring, a constructed and applied to the frames of the eye glasses substantially as described.

2d, The studs, c c, made and applied to the frame of the eye glass, and the spring, substantially as described, for the purpose specified.

78,191.—CAR SPRING.—D. G. Daniels, Cincinnati, Ohio, assignor to himself and F. Mortimer Atkinson, Chicago, Ill.

I claim a spring which is composed of plates, A A, bent in the form of segments of a cylinder, and put together at right angles to each other, substantially as described.

78,192.—COMBINED ARM REST AND PAPER CUTTER.—Chas. S. Dickinson, Brooklyn, N. Y. Antedated May 18, 1868.

I claim the combined arm rest and paper cutter made substantially as and for the purposes set forth.

78,193.—SASH SUPPORTER.—C. F. Dodge, Williamsport, Pa.

I claim the combination and arrangement of the pivoted double inclined plane, B, roller, C, lever, A, and stop or cam, D, in a suitable box or casing, substantially as shown and described, for the purpose specified.

78,194.—REGULATING CANNON LUMBER WAGONS.—James W. Drew, Stockbridge, Mich.

I claim, 1st, The use and application of the wheel, B, to common team wagons, for obviating the knock and jerk of the tongue or draft pole, F, on rough roads, as substantially shown and described.

2d, The bar, D, pinion, C, combined and operating in the manner as herein shown and described.

78,195.—METHOD OF MOUNTING PHOTOGRAPHS AND ENGRAVINGS.—John L. Duffee, Washington city, D. C.

I claim the mode of mounting photographic or other pictures produced upon paper, substantially as herein described.

78,196.—MANUFACTURE OF FINGER BARS FOR HARVESTERS.—Rufus Dutton, New York city.

I claim constructing the finger bars of harvesters substantially as described, that is, forming by suitable machinery or mechanism a metallic plate of the required thickness for a finger bar, and of a width sufficient for two bars, and having both of its edges or sides turned up or raised above the general surface or plane of the plate, and then dividing or cutting such plate obliquely lengthwise, so that when so divided there will be formed two separate plates, each suitable for a single bar of tapering form, and each having a raised or turned up edge, for the purpose set forth.

78,197.—METHOD OF CONSTRUCTING FINGER BARS OF HARVESTERS.—Rufus Dutton, New York city.

I claim constructing the finger bars of harvesters substantially as described, that is, forming a metallic plate of a breadth sufficient for two bars, such plate having its edges raised or turned up, and also having ribs or raised portions towards its center, and parallel with its edges, so that when such plate is divided diagonally lengthwise into two parts, it will form two bars, each having two parallel ribs or raised portions, substantially as set forth.

78,198.—DITCHING MACHINE.—T. B. Fagan, Mendon, Ohio.

I claim, 1st, In combination with the wheel, F, the arms or supports, D D, provided with adjustable holes, as and for the purpose described.

2d, In combination with wheel, F, and supports, D D, the chute, E, constructed and employed substantially as and for the purpose specified.

3d, The combination of the ditching wheel, F, chute, E, supports or arms, D D, and shaft, J, furnished with pinions, j j, arranged and operating substantially in the manner and for the purpose set forth.

78,199.—CHURN.—J. H. Fleming, Groton, Ohio.

I claim the dasher, D', constructed as set forth, in combination with the hinged cover, B, with the gearing arranged in connection therewith substantially as and for the purpose set forth.

78,200.—MACHINE FOR ROUNDING THE CORNERS OF SLATE FRAMES.—John Flory, Flicksville, Pa.

I claim in combination with the disk or arm, G, with its crank pin, the connecting rod, H, and the arm, I, on the shaft, J, for vibrating the frame, K, and cutter, Y, substantially as described.

78,201.—DEVICE FOR UPSETTING TIRES.—A. H. Ford, Williamsfield, Ohio.

I claim the combination of levers, A A, pivoted together by an eccentric joint, with adjustable support, E, and screw, I, substantially as described.

78,202.—BRIDGE.—Edward Hamilton (assignor to himself and Matthew D. Rapp), Chicago, Ill. Antedated May 9, 1868.

I claim, 1st, In combination with the sheets, A, of metallic plates, placed edgewise to sustain the incumbent weight, a system of cross braces, B, to support the same, substantially in the manner set forth.

2d, In combination with the metallic plates, disposed as set forth, and wooden cross braces for supporting the same, plates for inclosing the spaces between the edges of the sheet, substantially as set forth.

78,203.—CULTIVATOR.—George D. Hart, Muncy, Pa. Antedated May 11, 1868.

I claim the above, as set forth, whether used in combination with this machine or separate in any other, reference being had to Letters Patent above referred to.

78,204.—LOUNGE.—Wm. C. Hart (assignor to himself and Charles S. Jones), Nantucket, Mass.

I claim the improved lounge, as made with the reversible back, and with the connections and supports thereof, applied to and arranged with the two extremes of the body of such lounge, substantially in manner as specified.

78,205.—STEAM ENGINE SLIDE VALVE.—James Hemphill, Pittsburg, Pa.

I claim the combination of the valve cover, c, with its stem, c', and the diaphragm, s, and plates, o o', arranged substantially as described, for the purpose set forth.

78,206.—RAILROAD CAR VENTILATOR.—Robert Heneage and F. W. Breed, Buffalo, N. Y.

We claim, 1st, The coupling, E, when constructed and operating substantially in the manner shown and described.

2d, The pivoted case, H, provided with wings, n n, and vane, l, in combination with the wind wheel, f, screw or fan, J, and register, p, the whole arranged and operating substantially as and for the purpose set forth.

3d, The combination of the two devices herein described, for supplying pure air and withdrawing the impure air from railroad coaches, substantially as set forth.

78,207.—PARLOR SKATE.—Robert Hewson, San Francisco, Cal.

I claim in a parlor skate the use of wheels, B, having their axles, D, turning upon the friction rollers, C C C, the whole constructed and arranged substantially as herein described.

78,208.—GRAIN REGISTER.—Sidney Hudson, Milford, Mich.

I claim, 1st, The construction of the striker, C, and its connections, working over the apertures, B, in the receiving box, A, substantially as described, for the purpose designed.

2d, The combination and arrangement of the striking and tallying machines, substantially as described, for the purposes indicated.

78,209.—APPARATUS FOR THE MANUFACTURE OF COAL GAS.—David H. Iriland, Fayette, N. Y.

I claim the interposed condensing cylinder, B, constructed with the elevated ash pan, D, and water chamber, G, and employed in connection with the retort, A, purifier, H, and gasometer, K, substantially as and for the purpose herein set forth.

78,210.—AXLE BOX FOR RAILROAD CARS.—David Jewett (assignor to himself and Albert Leach), Lynn, Mass.

I claim the construction and arrangement of an axle box, when composed of the parts, C C, A A, and combined with the rollers, D D and grooved axle, D, in the manner and for the purpose herein described.

78,211.—MACHINE FOR CUTTING HEEL SEATS.—Arza B. Keith, North Bridgewater, Mass.

I claim so combining, with a reciprocating or vibrating knife, d, a heel support, k, that relative adjustment may be made between the two, substantially as and for the purpose specified.

Also, pivoting the piece, k, to the slide, i, and combining therewith means for changing the angle of k, substantially as and for the purpose described.

Also, in combination with the piece, k, a side adjusting screw, substantially as set forth.

78,212.—MACHINE FOR MOLDING WOOL SCREWS.—Edwin H. Keith, Bridgewater Mass.

I claim, 1st, The combination, with the perforated table, C, of the screw patterns, g g g g, and the mold board, E, provided with the perforations as described, substantially as and for the purpose set forth.

2d, The detachable spindles, h, provided with the pattern screws, g, and corresponding guide screws, i, substantially as and for the purpose specified.

3d, The perforated table or plate, C, provided with the adjusting strips or gages, c e' e'' e''', as and for the purpose described.

4th, So forming the molds of the runners, leaders, and sprues, and connecting them with the molds for the screws, that the breakage of the metal will be at or near the center of the screw heads, as set forth.

78,213.—METHOD OF FORMING CARRIAGE AXLES.—John Le Ferre, Charlestown, Mass.

I claim the method herein described of constructing a carriage axle, A, namely, by placing two or more steel or iron bars longitudinally, one upon the other, welding the same thoroughly together, then turning down the taper, b, with the shoulder, m, thereon, and then adjusting on said taper, b, and against the shoulder, m, a suitable collar, 6, and washer, 7, all in the manner substantially as set forth.

78,214.—SOAP.—David C. Lincoln, North Vassalboro, Me.

I claim the combination of nitrate of potash with a fat, or oil and an alkali combined, to form a soap, as set forth.

78,215.—MACHINE FOR POLISHING WOOD.—John S. Loomis, Brooklyn, N. Y.

I claim the sand block or rubber, B, cup, D', pipe, T, revolving brushes, W W, dusting brush, N, stationary rubber, F, emery cup, D, and adjustable bed, G, all combined and operating in the manner and for the purpose substantially as described.

78,216.—SKATE FASTENING.—Halsey B. Lucas, Middletown, Conn.

I claim, 1st, The heel strap buckle for a skate, shaped to conform to the curve or instep of the foot, as shown at a a a, and constructed with the loop, b b', and with a curved locking lever, c g, all substantially in the manner and for the purpose described.

2d, The two curved portions, a c, constructed as described, in combination with the curved loop, b, having a curved portion, b', and with the adjusting strap, B, substantially in the manner described, and for the purpose of facilitating the fastening of a skate upon the foot, as set forth.

3d, A curved self-locking skate buckle, such as described and shown, as a new article of manufacture.

78,217.—COOKING STOVE.—John Magee, Chelsea, Mass., assignor to the Magee Furnace Company.

I claim the auxiliary flue, L, placed below the bottom of the return flue, K, and provided with suitable perforations or openings, e, in combination with one or more tubes or conductors, M, and one or more perforated trunks, N O, or perforated plates, substantially as and for the purpose described.

78,218.—METALLIC DOORS AND SHUTTERS.—C. K. Marshall, New Orleans, La. Antedated May 14, 1868

I claim a double cased and double-panelled metallic door or shutter, when the same is constructed and arranged substantially as described.

78,219.—SOCKET BOARD FOR REED INSTRUMENTS.—David Marshall, Pittsburg, Pa.

I claim the board, f, placed immediately below and in contact with the socket board, b, and having an opening or openings, s s', under each reed, coinciding with but shorter than the openings or sockets, s, in the socket board, substantially as and for the purpose described.

78,220.—SCRAPER.—Norman Maybee and Abram Maybee, Monroe, Mich.

We claim the combination of the scraper, A, draft ball, C, and handle, B, all constructed and arranged substantially as described and for the purposes specified.

78,221.—BRICK MACHINE.—B. J. McAfee, Delphi, Ind.

I claim the combination of the frame, A, and table, C, with the molds, D D, spout, I, former, G, screw, H, plungers, E, and lever, F, all arranged and operating substantially as and for the purpose described.

78,222.—MACHINERY FOR PRINTING YARN.—William McAllister, Lawrence, Mass.

I claim the holder, D, made of wire netting, or its equivalent device, for holding skeins of yarn during the process of printing the same, substantially as set forth

78,223.—SPRING BED BOTTOM.—Stephen B. McCracken, Detroit, Mich. Antedated May 12, 1868.

I claim the button-headed half spring fastened to the webbing or other cover by the use of a common screw and convex washer, as shown in fig. 3, substantially as and for the purpose herein described.

78,224.—DEVICE FOR FEEDING BOILERS.—Henry McGann, Cleveland, Ohio.

I claim the arrangement of the pendulum, B, shaft, C, case, A, segmental arm, E, wheel, F, and cock, H, substantially as herein specified.

78,225.—PRESS SPINDLE ADJUSTMENT.—Alanson H. Merriman, New Britain, Conn.

I claim the combination of the tool stock or spindle, A A, with the sleeves, B and E, and collar, C, arranged and operating substantially as and for the purpose described.

78,226.—PORTABLE OVEN.—F. C. Miller, Evans Center, N. Y.

I claim the combination, with the chamber, B, provided with central heating space, i, and surrounded by jacket, A, of the pans, made up of two parts, C D, the latter being detached, and in skeleton or open form, for allowing a free passage of air or steam, and covered by slides, F, the whole operating in the manner and for the purpose herein set forth.

78,227.—PEG FLOAT.—William Miller, John J. Becker, and Abraham Simcox (assignors to themselves and Jacob Miller), Fort Wayne, Ind. Antedated May 15, 1868.

We claim the elbow lever, D, and connecting link, d, in combination with the reciprocating cutter, A, and guides, B, the whole being constructed and operated in the manner and for the purposes specified.

78,228.—CHEESE CUTTER.—Marshal Morse and P. W. Sawyer, Gray, Me.

We claim, 1st, The combination of the coil, h, rack, g, slide, k, and knife, l, as and for the purpose described.

2d, The slide stop, m, in combination with the self-retracting knife, l, as and for the purposes described.

78,229.—SHUTTLE.—Elias A. Paine, Sutton, Mass.

I claim the combination with the spindle head, formed between the points, 1 and 2, and the points, 1 and 3, in the manner specified, of the lever, b, and its cam, d, and the spring for actuating said lever, with or without the bobbin-holding catch, the said parts being constructed and arranged for operation as herein shown and set forth.

78,230.—WELDING THE EARS OF ELLIPTIC SPRINGS.—Joseph Palmer, Concord, N. H.

I claim the combination of the wedges, F F, the drop, A, the upper and lower dies, C D, the slides, a b c d, and end pieces, I I, all constructed and arranged as shown, and by means of which vertical and lateral blows are given at the same time, for the purpose set forth.

78,231.—COMBINED OVEN AND BATH.—James Perry, Brooklyn, N. Y.

I claim, 1st, The method of utilizing the heat from the interior of a baking oven or furnace for the purpose of warming apartments, substantially as herein specified

2d, The spaces under or by the sides of bath rooms, with their pipes communicating with the open furnace or oven, when the arrangement of the several parts is substantially as and for the purpose of operating in the manner shown.

3d, The combination of the boilers, O O, located in an inclosed space, with one or more conductors of the waste heat from a baking oven, whereby the said waste heat is caused, without coming in direct contact with said boilers, to warm the water required for use in the manufacture of bread and the administration of baths, substantially as herein specified

4th, The combination, with a system of radiating pipes located in an apartment, of a series of waste heat conducting pipes, and a series of steam conducting pipes, so that either the waste heat or the steam, or both together, may be employed at such time as may be required for warming the apartment, substantially as herein specified.

78,232.—APPARATUS FOR APPORTIONING, EXPANDING, AND SHAPING DOUGH FOR THE MANUFACTURE OF BREAD.—James Perry, Brooklyn, N. Y.

I claim, 1st, The combination, with a kneader, A, of the valve, I, and its chamber, substantially as herein specified, whereby the expansion of dough, prepared under pressure of gas, can be regulated as desired.

2d, The double-head valve, I, constructed and operating substantially as herein specified.

3d, The combination, with the kneader, A, of the perforated plate or strainer, a', substantially as herein specified, for preventing lumps of unmixed dough or other hard substances impeding the perfect operation of the valve, I.

4th, The combination of the hollow arm, D, with one or more chambers and pistons, substantially as herein specified, whereby the dough may be apportioned and shaped as desired.

5th, The movable cross head, F, in combination with the wheel, E, and rack bars, S S, substantially as described, whereby the capacity of the chambers, H H, may be increased or diminished, as desired.

6th, The combination, with the valve, I, of the balance lever, b, and its appendages, substantially as and for the purpose herein specified.

7th, The combination, with the arm, D, and table, J, of the arms, e' e', substantially as specified, whereby the pans are brought under and away from the chambers, H H, for filling and discharging them.

78,233.—CULTIVATION OF THE COTTON AND OTHER PLANTS.—Philip Foullain, Greensboro, Ga.

I claim, 1st, The improved cup, having taper sides, and both ends open, when adapted and employed for germinating and transplanting cotton, and other small and tender plants, in the manner and for the purpose herein described.

2d, The improved method herein described for transplanting cotton and other plants by means of the device, in the manner and for the purpose herein set forth.

78,234.—WATER GAGE FOR STEAM BOILERS.—Charles Lowell Ridgway, Boston, Mass.

I claim the water gage, D, attached to a lever or bar, B, provided with passages, g i, and arranged in relation to the inlet passages or tube through which the water and steam are admitted from the boiler, substantially as described.

Also, the passages, h n f o, in the bar, A, and lever, B, in combination with the adjustable stop, m, or its equivalent, so arranged as to allow the steam to be blown through the gage, substantially as set forth.

Also, the passage, l, in the lever, B, in combination with the passage, l, in the bar, A, and the stop pin, 6, arranged so as to allow the water in the glass tube, D, to escape when the connections with the boiler are cut off, substantially as described.

78,235.—AGRICULTURAL STEAM BOILER.—Louis S. Robbins, New York city.

I claim, 1st, The corrugated plates, H, in the fire box, substantially as and for the purposes descr bed.

2d, The protecting sleeve, K, on the pipe, J, substantially as described.

3d, The supply pipe, J, provided with the cocks, n o and L, and connected with the water reservoir, m, substantially as described.

4th, The method of forming the joint between the cup, C, and the boiler, substantially as described.

5th, The combined vacuum and safety valve, constructed and operating substantially as shown and described for the purposes specified.

78,236.—HARVESTER.—Samuel Rockafellow, Muscatine, Iowa.

I claim the double hinge, G, constructed substantially as described, in combination with the frame, A, cutter bar, B, links, g', crank, g'', and levers, H and I, the said parts being arranged to operate substantially as and for the purpose described.

78,237.—CORN PLANTER.—Orestes Sampson, Petersburg, Ill., assignor to Sampson and Fracke ton.

I claim, 1st, A corn planter, consisting of an axle mounted on wheels, and having the inclined bars, B, attached thereto, with the rear ends provided with seed hoppers, H, shares, n, and covering wheels, n, or their equivalents, arranged to operate substantially as described.

2d, The levers, E, arranged as described, in combination with the frame carrying the seeding mechanism, and pivoted to the axle or front frame, for the purpose of elevating the seeding devices, as described.

3d, Providing the bars, B, with a flat surface on their under side, where they rest upon the ground, in front of the shares, n, for the purpose of pulverizing and smoothing down the earth to form a seed bed, as herein set forth.

78,238.—RATTAN MACHINE.—Sylvanus Sawyer, Fitchburg, Mass.

I claim, 1st, The combination of the series of revolving splitting cutters with the series of guides, substantially as described.

2d, Combining each revolving cutter and its guide with the other cutters and guides of the series, by means of the gears, I, so that they shall be made to simultaneously approach and recede from the center of the stick, substantially in the manner and for the purpose described.

3d, The combination of the series of revolving splitting cutters with the annular or tubular cutter, substantially as described.

4th, The combination of the revolving splitting cutters, the tubular cutter, and the guides, substantially as described.

5th, The combination of the splitting apparatus, before described, with a suitable feeding mechanism for carrying forward the stick, substantially as described.

78,239.—HORSE RAKE.—John Seely, North Java, N. Y.

I claim a revolving rake, formed of three ranges of tines, with their ends inclined or curved, as specified, so that the rake can be drawn along upon the points of two of the ranges of tines, and the forward range of tines pass at an inclination beneath the hay, as specified.

78,240.—MAIN BOLT OR GOOSE NECK STAY ON CARRIAGES.—Alfred B. Sheaffer, Ephrata, Pa.

I claim the socket, a, in the enlarged curve, H, of the main bolt stay, A, when made substantially in the manner and for the purpose specified.

78,241.—IMPLEMENT FOR HARVESTING GRAPES.—J. F. Single, Painesville, Ohio (William Pottingell, administrator.)

I claim, 1st, Constructing the described implement in the manner of forceps or pliers, and providing the broad jaws thereof with correspondingly broad pads or cushions of an elastic nature, as india-rubber, so as to operate substantially in the manner and for the purposes herein specified.

2d, The shear-edged blade, d, and serrated blade, e, in combination with the jaws, b b, and handles, c c, operating so as to sever the stem of the cluster with certainty, as herein set forth.

3d, The combination of the several parts of the described implement, to wit, pads, a a, jaws, b b, shear-edged blade, d, serrated blade, e, slotted stop plate, f, and handles, c c, all arranged so as to effect the purposes herein set forth.

78,242.—MACHINE FOR MOLDING COLLARS.—George H. Spaulding, Norwich, Conn., assignor to American Molded Collar Company, Boston, Mass.

I claim the combination, with an expanding former, of an elastic bed or cushion, C, against which the collar is pressed, substantially as shown and for the purpose described.

78,243.—CULTIVATOR.—Orrin Stone, Ionia, Mich.

I claim the combination of the fixed and the yielding frames, when united together by flexible connections, and the under or yielding one is made capable of being raised and carried by the fixed one, in the manner and for the purpose herein described and represented.

78,244.—JOURNAL BOX FOR RAILROAD CARS.—Matthew Thornton, Macon, Ga.

I claim the packing of a journal box by means of the divided collar, the fibrous packing, and the gland, arranged to operate in conjunction with the axle, substantially in the manner and for the purpose described.

78,245.—HARVESTER.—Godfrey Welland (assignor to himself and Ira R. Amsden), Buffalo, N. Y.

I claim the combination of the pinion, C, or the driving wheel hub, having a square shank, D, the movable part, E, fixed part, B, with covering rim, a,

and coiled spring, F, constructed, arranged, and operating in the manner and for the purpose described.

78,246.—MACHINE FOR BORING HUBS FOR WAGON WHEELS.—Joseph Wharff, Bangor, Me.

I claim my improved arrangement and application of the hooked bar, F', the screws, F', H, and the lever nut, c, with respect to each other.

78,247.—STILL.—H. Whisler and J. S. Berry, New Market, Ohio.

We claim the cap, C, when constructed with the spiral channel, e, pipe, g, and conduit, f, in the manner substantially as set forth.

78,248.—IMPLEMENT.—E. F. Wilder, Lowell, Mass.

I claim the belt punch, when constructed and arranged to operate as and for the purpose set forth.

78,249.—VENTILATING PORTABLE CHURN.—E. P. Williams, Yorkville, S. C., assignor to himself, W. L. Hopson, and A. R. Homesley.

I claim the beater arm, B, blades, C C and D, in combination with the driving wheel, F, and dasher or pinion wheel, E, when the whole is constructed and arranged so as to operate substantially as described and for the purpose specified.

78,250.—PENMEN'S ARM REST.—Jerome B. Withey, Lexington, Mich.

I claim the planes, A B, the adjustable supporting connections, C C, the supporting brace, D, the rack, E, the check brace, F, and the stop, G, when arranged substantially as described and for the purposes set forth.

78,251.—DRILL HOLDER.—Thomas K. Bacon (assignor to himself, George A. Pratt, William T. Norton, and Hiram B. Crosby), Norwich, Conn.

I claim the combination of the jaws, d, with the washer, a, the right and left thread screw, e, and the bar, x', the same being constructed and operating conjointly with and in the socket, b, in the manner and for the purpose herein set forth.

78,252.—BROOM HOLDER.—F. B. Batchelder, Prairie du Chien, Wis.

I claim the blocks, A B, each formed with a semi-circular recess in its inner face, and connected together by the spring, D, all constructed and arranged to operate in the manner and for the purpose substantially as set forth.

78,253.—BEEHIVE.—Henry Baughman, Columbus, Ohio.

I claim, 1st, The projecting entrance for the bees, surrounded by the false entrance to the air-chamber, as arranged and described.

2d, The feeding troughs with their connecting tubes and wire gauze covering, as shown and described.

3d, The combination of comb frames with the wire gauze covering, as arranged and shown.

78,254.—SIGN FOR TOBACCONISTS.—J. W. Boughton, Appleton, Wis.

I claim, 1st, The combination, with an image figure, of the mechanism for automatic smoking, substantially as and for the purposes set forth.

2d, The application of the air bellows, A, provided with the tubes, B C, and their valves, to an inanimate figure, for simulating the operation of smoking, substantially as shown and described.

3d, In combination with the air bellows, A, the reciprocating piston, k, bar, h, pitman, g, and crank, f, of the clock movement, D, arranged and operating in the manner and for the purpose described.

4th, As an improved tobacconist's sign, the mechanical or automatic smoking image herein described.

78,255.—SHEARS.—Alfred B. Buell and George W. Root, Pittsfield, Mass.

We claim the shears, consisting of blade, A, with its two cutting edges, o o' blade, A', with its jaws, a a', slot, e, and cutting edges, p p', constructed as described, as a new article of manufacture.

78,256.—PROCESS OF TANNING HIDES AND SKINS.—F. J. Burcham (assignor to himself and L. S. Blake), Racine, Wis.

I claim the herein described process for tanning hides and skins, substantially as and for the purpose described.

78,257.—POTATO DIGGER.—J. W. Burnham and Wilson Conlon, Middletown Point, N. J.

We claim, 1st, Connecting the oscillating frame, D, which carries the lower apron roller, F, and the scoop, H, by means of a rod and crank, with a lever, L, so that the position of the apron and scoop can be adjusted at once, as set forth.

2d, The arrangement and combination, with each other, of the roller, C, oscillating frame, D, roller, F, apron, G, scoop, H, rods, l m and r s, and levers, L and M, all made and operating substantially as herein shown and described.

3d, Providing the lower part of the frame, D, which carries the endless apron and the scoop, with curved projections, h h, moving in curved guides, E E, as set forth.

78,258.—COPYING INK.—A. G. Busby, Philadelphia, Pa.

I claim an ink, composed of water, galls, sulphate of iron, indigo, sugar, gum-arabic, or other well-known ink-making ingredients, in combination with glycerine or gelatine, or both, and bichloride of mercury, or its equivalent, the whole being combined in the proportions substantially as described for the purpose specified.

78,259.—FOLDING STOOL.—W. E. Cameron, Green Island, N. Y.

I claim the plate, A, constructed as described, and provided with the ears, a1 a2, to receive the arms, B D, whereby the arms, B, are adapted to be folded up beside the arms, D, when the latter are folded, substantially as described for the purpose specified.

78,260.—RUBBER AND GUTTA-PERCHA HOSE.—E. M. Chaffee, Providence, R. I.

I claim the rubber or gutta-percha hose, flattened between plane surfaces, under the heat of vulcanization, substantially as described for the purpose specified.

78,261.—APPARATUS FOR TREATING OFFAL.—James P. Chenoweth and Edwin P. Baugh (assignors to Baugh & Sons), Philadelphia, Pa.

We claim, 1st, Treating offal by subjecting it, in a revolving cylinder, or its equivalent, to the combined action of heat applied to the outside of the cylinder, and to a blast of heated air or products of combustion introduced into the cylinder, all substantially as and for the purpose herein set forth.

2d, The revolving cylinder, D, constructed substantially as described, in combination with a fireplace, C, oven, A, and pipes, passages, and fans, or equivalent devices, whereby the surface of the said cylinder is heated, and a hot blast forced through the interior of the same, in the manner and for the purpose herein set forth.

3d, The spiral rib, i, having a tendency to force the material through the cylinder in a direction opposite to the course of the hot blast, as described.

4th, The pipes, H and H', and the fan, F', arranged, in respect to the furnace, C, and compartment, b, of the oven, substantially as herein described for the purpose specified.

78,262.—CORN PLANTER.—Wm. R. Clark, Indianola, Ill.

I claim the hinged frame, A and B, with the seats, G and F, upon one part, and the plows and hoppers upon the other, substantially as shown and described and for the purpose specified.

78,263.—STAIR-CARPET FASTENER AND PROTECTOR.—J. Conner, Jr., Chicago, Ill.

I claim, 1st, A device, B, having axial extensions, c c, the same constituting a combined stair rod and protector, or stair-carpet fastener and protector, substantially as and for the purpose described.

2d, The combined stair rod and protector, B c, in combination with the ears or holders, e e, substantially as described.

3d, The depressed lip, a, on the front edge of the protecting cover, B, of the combined stair rod and protector, as described.

78,264.—MANUFACTURE OF PYROLIGNEOUS ACID.—Morton E. Converse, Bindge, N. H., and Abel T. Atherton, Lowell, Mass. Antedated May 12, 1868.

We claim the application and arrangement of the fine tubes, f f and g g, in one or more rows, to a kiln, in such a manner that they will conduct, carry off, and save, the products of destructive distillation of wood, substantially as described and set forth.

78,265.—SAFETY HATCH.—G. N. Creamer (assignor to himself and John B. Lalor), Trenton, N. J.

I claim, 1st, The construction and arrangement of hatchways, when operated in the manner and for the purpose herein described.

2d, The combination of the hatch carriages, A A, levers, J, weights, C, cords I, and pulleys, k, in the manner and for the purpose herein described.

3d, The locking device or levers, J, in combination with the truck or carriage, A A, in the manner and for the purpose herein described.

78,266.—FORGING MACHINE.—William H. Defrees, Andover, Mass.

I claim the combination, for the purpose specified, of two or more pairs of sliding hammers, d, and independent springs, j, to work each hammer, inclined ways for each slide or hammer, and an inclined rotative cam, operative on all of the slides or hammers, all arranged and operating substantially as set forth.

Also, for moving the blank bed from the hammers to the cutters, the combination of the cam, b, the hand-worked slide, d', and the several levers and connections between said slide and the blank bed, which cause the bed to be moved by the cam, b, substantially as described.

Also, for causing the cutters to operate upon the forged nail, to sever it from the nail rod when in position over the fixed cutter, the combination of the hand lever which moves slide, d', with the hooked rod, o, pendent from the cutter arm, v, to throw the hook of said rod into gear with the vibrating pin, u, worked from a motor, f, on the main shaft, substantially as described.

78,267.—REEFING FORE-AND-AFT SAILS.—R. C. Denham, Richmond, Me.

I claim combining with the diagonal re-enforced line of a fore-and-aft sail, and with the gaff of such a sail, gaff down hauls, and eyes or leaders, in the manner substantially as described, so as to secure the gaff to the aforesaid line in the act of reefing.

78,268.—BRICK MACHINE.—François Durand, Paris, France

I claim, 1st, The combination of the pin, b, pitman, B', pistons, P P', grooved bars, G, cams, c, yokes, C', and crank shaft, A, all arranged and operating as herein described for the purpose specified.

2d, The combination of the eccentric disk, D, connecting rod, J', gear wheels F F', ratchet, j', upon shaft, E, the catch, j, and the oscillating arm or disk, as herein described for the purpose specified.

78,269.—ROOFING COMPOUND.—D. W. Denton, Ithaca, N. Y.

I claim, 1st, Preparing my roofing material of the substances and substantially in the manner set forth.

2d, Its use with coal tar, as described.

3d, The use of coal ashes, in combination with the described material, and in the manner set forth.

78,270.—ICE CALK.—G. W. Farley (assignor to himself and W. H. Humphrey), Manchester, N. H.

I claim the button, C, with notches, i i, and provided with the spring, s, or its equivalent, in combination with the pins, c c, the tongue, d, and the plates A B, all constructed, arranged, and operating as and for the purpose herein described.

78,271.—PAPER CLIP.—A. H. Fatzinger, Washington, N. J.

I claim the curved elastic clips, B, perforated, and attached to the strip or cleat, A, in combination with the spurs, a, in the latter, substantially in the manner as and for the purpose set forth.

78,272.—TAPE BOX.—A. J. Fellows, Meriden, Conn.

I claim the catch, G, in combination with the toothed drum, B, spindle, H, lever, I, coiled spring, case, A, and tape, C, substantially as described for the purpose set forth.

78,273.—MACHINERY FOR PRINTING YARN.—John Foster, Pawtucket, R. I.

I claim the combination, with a pair of fluted or grooved rollers, A A', in a machine for printing yarn, or other material, upon both sides, of an elastic apron, G, or its equivalent, substantially as described for the purposes specified.

78,274.—WINDOW-SASH FASTENER.—O. S. Garretson, Buffalo, N. Y.

I claim, 1st, The combination of the bolt, E, provided with the wedge head h, and the catch, C, provided with teeth, b, or a series of teeth, b, operating in the manner and for the purpose substantially as herein set forth.

2d, Securing the plate, G, to the case, D, by eyelets or hollow rivets, k, attaching in the ordinary screw holes, l, as herein set forth.

78,275.—LINK.—Alexander Goodhart, Newville, Pa.

I claim a link formed of the parts, A and B, the latter being provided with a curved shank, b1, and a tenon, b2, and operating in connection with the part, A, substantially in the manner and for the purpose specified.

78,276.—SOUNDING BOARD FOR PIANOS.—G. M. Guild, Boston, Mass.

I claim, in combination with a sounding board, and the main supporting ribs, c, thereof, the auxiliary ribs, e, crossing and secured to the ribs, c, substantially as shown and described.

78,277.—TRACE-LUG LOOP.—Michael Gumfory, West Middlesex, Pa.

I claim the tug loop, A, when arranged with shanks, B B, and attached to the trace by rivets, a a, substantially in the manner and for the purpose as herein shown and described.

78,278.—DOOR INDICATOR.—Amos Hadley, Washington, D.C. assignor to himself and Robert Clenighen, New York city.

I claim the rotating disk between the two stationary plates, all as shown and described and for the purposes specified.

78,279.—WOOD-CARVING MACHINE.—Isaac Hall, New York city.

I claim the combination of the parallel pivoted bars, D, pivoted connecting bars, F, double arms, G, adjustable arms, I, and centers, H and J, with each other, and with the frame, C, substantially as herein shown and described, and for the purpose set forth.

78,280.—SAFETY VALVE.—Frederick Harden, Conshohocken, Pa.

I claim the arrangement of the cap, F, and weighted ring, G, with relation to the stem, E, and the valves, C D, of different diameters, as herein described for the purpose specified.

78,281.—SEED PLANTER.—E. P. Harris, Conneautville, Pa.

I claim, 1st, The cut-off, F, with the spring, G, in connection with the aperture, a, in the slide bar, H, provided with the inclined rear end, b, all arranged substantially as and for the purpose specified.

2d, The slide, L, applied to the slide bar, H, in relation with the aperture, a, substantially as and for the purpose set forth.

78,282.—HARNESS.—J. K. Harris, Springfield, Ohio.

I claim, 1st, The provision, in a breast collar or hames strap, of the flexible, extensible, and elastic device, X x M, the same being provided with check pieces, b b', C D, substantially as and for the purposes herein explained.

2d, The arrangement of draft strap, B, open leather frame or breast strap, A, thongs, X, spiral springs, M, and check pieces, b b' C D, as and for the purpose specified.

78,283.—REVOLVING HARROW AND ROLLER.—E. K. Harvey, Quincy, Ohio.

I claim, 1st, the lever, b, arm, n, and spanner, e, in combination with the harrow, H, substantially as described.

2d, The harrow, H, housings, d, and spanner, e, combined and operating substantially as described.

78,284.—CONCRETE BRICK MACHINE.—Frederick Hawkins, Chicago, Ill.

I claim the mold, L L', provided with slotted flange, S, and lid, M, with its rack, T, and pinion, W, the follower, N, with its rack, Q', and pinion, P, levers, Q R I and H, chain, F, drum, E, and wheel, Z, all arranged and operated substantially as and for the purposes herein set forth.

78,285.—DRIER.—Henry Henley, Halbert's Bluff, Ind.

I claim, 1st, The construction and arrangement of the movable steam-heated pans, C, so as to apply a regular heat above and below the chambers, E.

2d, The combination of the boiler, B, removable pans, C, and flexible pipes C', when arranged and operating as and for the purpose set forth.

78,286.—CHURN.—Charles Hess (assignor to R. T. T. Spence), Lyons City, Iowa. Antedated May 14, 1868.

I claim the combination and arrangement of the friction pulleys, A D C C, with the peculiar ogee curved shaped arms or paddles, F F F F, when constructed and arranged for the purposes above set forth.

78,287.—SHOE.—Marie L. Hill, New York city.

I claim, as a new article of manufacture, a quilted cloth slipper or shoe, formed by interposing between the soft filling and the outer covering a textile lining of the same color as the outer covering, whereby, as the latter becomes worn through or torn, the slipper or shoe will not be destroyed, but present the same uniform color exteriorly, as herein shown and described.

78,288.—MACHINERY FOR PRINTING ON FABRICS.—Chas. Holliday, Huddersneld, England.

I claim, 1st, The within-described process of ornamenting goods, by applying coloring or ornamenting material through tubes impressed against the material, with or without the aid of needless or leading wires, substantially as herein specified.

2d, The application of heat, in connection with the tubes in the above process, substantially as and for the purpose specified.

3d, In connection with printing through tubes, the enlargement of the tubes at and near the printing surfaces, so as to form cups, which tend to determine the depth in the tube from which coloring or other viscid matter is drawn at each impression, substantially as and for the purpose herein specified.

78,289.—SURCINGLE.—Stephen Hyde, New York city.

I claim, as a new article of manufacture, a surcingle, provided with two elastic joints, a a, when inclosed in leather cases, D, and secured to the buckle and tongue straps, b d, as herein shown and described, for the purpose specified.

78,290.—VEGETABLE SLICER.—George W. Jacobs, Quincy, Ohio.

I claim the combination of the plates, D D, the knives, d d, slots, b b, and slots, c c, in the table, A, and movable box, E, as and for the purpose specified.

78,291.—ADJUSTABLE HAMMER AND DROP.—Truman P. Keeler, Worcester, Mass.

I claim, 1st, The combination, with the hammer, of an adjustable stop block, F, and mechanism for operating the same, substantially as and for the purposes set forth.

2d, The combination, with the hammer, of the stop block, for checking its upward movement, the cams and cam shaft, for operating the hammer, and the lever, e, connected with and arranged to adjust both the cams and the stop block, substantially in the manner and for the purposes shown and set forth.

3d, The combination, with the adjusting lever, connected with the cam shaft and stop block, as specified, of the stop piece, G, or its equivalent, substantially as and for the purpose set forth.

4th, The stop jar, J, and treadle, or equivalent means for operating the same, in combination with the hammer actuating cams, under the arrangement and for operation as shown and set forth.

5th, The combination, with the hammer, and cams for operating the same, of the stops, p and J, connected with and actuated by the treadle, H, in the manner and for the purposes herein shown and specified.

6th, The combination and arrangement, with the hammer, its actuating cams, and the stop block for checking its upward movement, of the mechanisms herein described for adjusting said cams and stop block, and for arresting and holding the said cams and hammer, whereby the machine may be used either as a hammer or as a drop, and the stroke of the hammer, in either case, may be varied, substantially as shown and set forth.

78,292.—GRATE BAR.—Henry King, Waterbury, Conn., assignor to himself and Francis Stappers, New York city.

I claim a grate bar, formed in two longitudinal sections, or in one piece, having spaces, a, through the same, wider at the bottom, with apertures, a', opening into said spaces, a, substantially as shown and described, and for the purposes set forth.

78,293.—PLOW.—John Koffend, Appleton, Wis.

I claim the combination of a pivoted, adjustable, auxiliary land-side with the ordinary land-side of a plough, whether said auxiliary land-side be placed upon the outer or inner side of said ordinary land-side, substantially as herein shown and described, and for the purpose set forth.

78,294.—HORSE HAY FORK.—Hugh Laird, Mechanicsburg, Pa.

I claim the combination of the compressing and retaining bar or bow, D, with the elevating tines or prongs, C C, operating substantially as and for the purpose described.

78,295.—COMPOSITION TO BE APPLIED TO LEATHER.—William Lehman, Newville, Pa.

I claim the application of the composition herein described to boots, shoes, harness, straps, bellows, and leather manufactured articles generally, by which the same will become water-proof, and wear one hundred per cent longer.

78,296.—SYSTEM OF PRONOUNCING ORTHOGRAPHY.—Edwin Leigh, St. Louis, Mo. Antedated May 19, 1868.

I claim the use of a skeleton outline, or light form of an alphabetic letter, with a phonic sign included within it, or constituting a part of it, to indicate a particular sound of that letter.

Also, the use, in cases where several alphabetic letters must be employed for the same sound, of phonic signs closely resembling each other, so as to be substantially the same phonic sign, though used as the whole or parts of different letters.

Also, the employment of light faced letters, (as skeleton, hair line, outline, or in any way made of lighter color,) of otherwise the same general form, size, upright position, and character as the rest of the font, for silent letters, in combination with phonic letters, in order to indicate the pronunciation of words without changing the common orthography and familiar outline of the word or word picture.

Also, the employment of phonic vowel and consonant letters, (or peculiarly constructed forms of the alphabetic letters,) in combination with any peculiar class of letters, for the silent letters, in order to indicate the pronunciation of words without changing the common or established orthography, substantially as described.

78,297.—CONVERTING WROUGHT IRON INTO CAST IRON AND STEEL.—Alexander Lisk, Philadelphia, and Adam Woolever Allentown, Pa.

We claim the process of manufacture, substantially as and for the purpose set forth.

78,298.—SAWING MACHINE.—James R. Logan, Rolla, Mo. Antedated May 18, 1868.

I claim moving a sawing machine in the manner described by means of the wheels, C C, attached to the axle, F, substantially as and for the purpose specified.

Also, the socket, f, attached to the cross bar, J, on the front part of the frame, A, and provided with the catch, K, substantially as and for the purposes specified.

78,299.—PIPE WRENCH.—Nardo F. Loi, New York city.

I claim, 1st, The fixed handle, A, when its head, a, is perforated at right angles to the handle, to receive the screw shank, of the adjustable jaw, c, which is placed above and parallel with the jaw, b, of the handle, C, as herein described, for the purpose specified.

2d, The construction, arrangement and operation of the handle, C, having the perforated jaw, b, the pivoted nut, B, screw threaded handle, A, head, a, and adjustable jaw, c, as herein described, for the purpose specified.

3d, The jaws, d e f, when adjusted in the arm, b, of the lever, C, by means of the notches and transverse pin, g, as herein described or the purpose specified.

78,300.—APPARATUS FOR ROLLING DOUGH.—Nelson Long, Watertown, N. Y.

I claim, 1st, The combination, with the board or receptacle for holding the dough or other material, of the dough roller, and the sliding or transverse frame for supporting the same, hinged or pivoted in the manner described, so as to be adjustable to different hights above the said board or receptacle, substantially in the manner and for the purposes shown and specified.

2d, In an apparatus, such as described, the combination, with the auxiliary roll and the elongated bearings formed for its reception in the sliding frame, of adjusting or set screws, or equivalent means for regulating the position of the journals of the roll in their bearings, substantially in the manner and for the purposes shown and set forth.

3d, The combination, with the side boards, which form the bearings for the sliding frame, of the top plates provided with inclined projections, c, as described, and the correspondingly notched sliding bars, and its adjusting screws for raising and lowering said top plates, under the arrangement and for operation as herein shown and set forth.

78,301.—PADDLE WHEEL.—W. R. Manley, New York city.

I claim 1st, The combination of the controlling frame, E, of the paddles or the guard beam, F, and crank arm, G, substantially as hereinbefore set forth.

2d, The arrangement of the crank arm, G, diagonally to vertical and horizontal directions in which the guard beam may be moved by strains upon the vessel, substantially as hereinbefore set forth.

3d, The arrangement of the paddle crank arms, D, and the crank arm, G, at equal angles to a vertical line, substantially as hereinbefore set forth.

4th, The combination of the controlling frame, E, guard frame, F, crank arm, G, link, N, and main shaft, B, substantially as hereinbefore set forth.

78,302.—EXTENSION LADDER.—T. F. Mantey, New Orleans, La.

I claim, 1st, The winches, v, in combination with the extension lattice, A and chains, b, for the purpose of adjusting the lattice, when elevated by the screw, G, at any desired angle, as herein shown and described.

2d, The crank screw, J, and bar, K, in combination with the frame, T, and extension lattice, A, all substantially as and for the purpose shown and described.

3d, The combination of the pintle base, R, extension lattice, A, adjustable plate, Q, having the projection, q, bearing the pin, r, and tongue, M, all arranged and operating as described for the purpose specified.

78,303.—CORN AND SEED PLANTER.—Franklin W. Marriott, Richwood, Ohio.

I claim a seed planter, constructed and operated in the manner substantially as shown and described.

78,304.—RAILWAY CAR SEAT.—M. M. Martin, Cochran, Ind.

I claim, 1st, In combination with the seat body, A, hinged at, a, to the frame, B, the knuckle joint, E E', arranged and adapted to operate in the manner stated.

2d, The combination of the car seat, A B, leg supporting flap, J, and elastic thong, K, for the object explained.

3d, The combination of the foot rest, consisting of the wings, L L', inclined board, N, and hinged leaf, O, with the neck bar, R, and stud, S, for the purpose explained.

4th, The combination of the rail, D, hooks, d d', and flap, J, adapted to receive and enable the ready removal of the mattress, F, in the manner herein described and set forth.

78,305.—GAS REGULATOR.—S. F. Mathews, Mechanicsburg, Pa.

I claim, 1st, The nipple tube, B, and the thimble, E, constructed, arranged, and operating substantially as and for the purposes described, in combination with gas pipe.

2d, The body of the governor, A, the case, C, tube, B, thimble, E, and spring, b, in combination, forming a gas regulator, substantially as shown and described.

78,306.—ANIMAL TRAP.—John C. McClamrock, Edina, Mo.

I claim, 1st, The described arrangement of the bait hook, H, U-shaped lever, I, connecting rod, J, bell crank levers, K N, and adjustable spring catch, M, with relation to the pivoted trap door, C, all constructed and combined to operate in the manner and for the purpose substantially as set forth.

2d, The detachable receptacle, S, provided with partitions, s1, and slides, s1 s2, and having a grated top, when said receptacle is adapted to be connected with the box, A, by means of the adjustable passage, Q, in which the gate, R, is hinged, all constructed and arranged as and for the purpose set forth.

78,307.—GAS APPARATUS.—James McCleish, New York city, assignor to himself and E. V. Haughwout & Co.

I claim, 1st, The constructing of the gas holder, B, with rigid or inflexible top and bottom plates, a b, and flexible gas tight sides, the latter being folded or crimped, substantially in the manner as herein shown and described.

2d, The pressure arms, C D, arranged and applied substantially as set forth, and used in connection with springs or equivalent weights for the purpose of exerting a uniform pressure on the gas holder, substantially as set forth.

3d, The windlass drum, m, provided or arranged with a coil or barrel spring, and used in connection with suitable cords, for the purpose of raising or assisting in raising the gas holder during the process of the filling of the same, substantially as set forth.

4th, The elevating of the arms, C D, through the medium of the windlass, G, and cords, k k l, arranged and applied substantially as set forth.

5th, The drum, s, provided with an internal coil spring, t, and a fusee, w, on its exterior, in combination with the cords, a' a'' c' d'', arranged as shown, or in an equivalent way, for compressing the gas holder and exerting an equal or uniform pressure on the same.

6th, The cords, f k k and l, in combination with the windlass, H, all arranged to operate substantially as and for the purpose specified.

7th, The receiver, K, with the pipes, J L and M, communicating therewith, and provided with stop cocks, and all arranged substantially as shown and described.

8th, The rollers, h', on the top plate, a, of the gas holder, in combination with the vertical guide rods, i, arranged substantially as shown and described, for the purpose of retaining the holder in proper position.

9th, Bracing or staying the holder, B, by means of the straps, ax, extending around the interior of the holder and traversely across it, as shown and described.

78,308.—REFRIGERATOR.—Martin Meyers, Jr., Philadelphia Pa.

I claim, in refrigerators, the construction of the sliding drawer shelves, E, with swinging doors, C, and with a space, D, between their backs and the inner wall of the case, and the tubes, g, communicating with the atmosphere, substantially as and for the purpose described.

78,309.—BENCH DRILL.—Charles C. Miller (assignor to S. M. Spencer & Co.), Brattleboro, Vt.

I claim, 1st, The sleeve, M, fixed slotted tube, I, screw shaft, J, pin, l, and right angular lever, N g, or its equivalent, when said parts are applied to and used in connection with a drill, substantially as shown and described.

2d, The movable bed, H, arranged and operated substantially as shown, the slotted tube, I, screw shaft, J, balance wheel, K, and the adjustable pin, l, operated as shown, or in an equivalent way, all combined and arranged for operating the drill, L, substantially as described.

78,310.—PERMUTATION LOCK.—D. K. Miller, Reading, Pa.

I claim, 1st, The disk, E, with its projection, p, and shoulder, c, and secured to a shaft, D, in combination with disks, F, or their equivalents, and with a tumbler, G, having a recess and a projection adapted to the projection and recess of the disk, E, the whole being constructed and arranged with a casing A, and operating substantially as and for the purpose described.

2d, The serrations of teeth upon the ends of the split ring, t, for the purpose described.

78,311.—CURTAIN FIXTURE.—John P. Miller, Somerset, Pa.

I claim the stirrup, C, and its cramp, F G, the cord, D, and the pulley, E, combined, arranged, and operating substantially as and for the purpose set forth.

78,312.—CIGAR HEADER.—George Moebs, Detroit Mich.

I claim the metal cup, A, for heading cigars, constructed and operating substantially as described.

78,313.—ARTICLE OF BLUEING.—Edward L. Molineux, New York city.

I claim packing laundry blueing, when in lump or pressed, for transportation and use, in perforated boxes, substantially as described.

78,314.—CORPSE PRESERVER.—Mary E. Mott, Rouse's Point, N. Y.

I claim the flat rubber sack, a, having a slit and lacing, as shown, and the discharge tube, b, all substantially as shown and described, and for the purpose set forth.

78,315.—COOKING STOVE.—B. Newbury, Coxsackie, N. Y.

I claim, 1st, The combination of a hinged shelf, E, with the rear part of the stove, whether said shelf is hinged directly to the stove or to a removable plate attached to said stove, substantially as herein shown and described, and for the purpose set forth.

2d, The combination of the removable plate, A, and removable yoke, B, with the hinged shelf, E, substantially as herein shown and described, and for the purpose set forth.

3d, The combination of the arm, C, and set screw, D, with the plate, A, substantially as herein shown and described, and for the purpose set forth.

4th, The combination of the pivoted brace arm, F, with the hinged shelf, E, substantially as herein shown and described, and for the purpose set forth.

78,316.—SHIPPING CASE.—Moses H. Nichols, Hancock, N. Y.

I claim the combination of the slides, S, octagonal cover, F, and elastic cushions, C, with each other, and with the case, A, and jar, D, substantially as herein shown and described, and for the purpose set forth.

78,317.—EXPLOSIVE COMPOUND.—Alfred Nobel, Hamburg, Germany, assignor to Julius Bandmann, San Francisco, Cal.

I claim the composition of matter, made substantially of the ingredients and in the manner and for the purposes set forth.

78,318.—PRESS.—B. S. Norris, Ripley, Ohio.

I claim the combination, with the frame, A, of the presser, B, hand lever, C, spring pawls, a and c, and the weight, D, substantially as and for the purpose described.

78,319.—DEVICE FOR CUTTING SHEET IRON.—John B. Osier, Ogdensburg, N. Y.

I claim the construction and arrangement of the frames, A A, with the perpendicular guides, C C, angular knife, and cross bars, D and E, with the spring, H, and sliding guide, F, and treadle, I, all arranged and connected for the purpose set forth.

78,320.—STARCH TRAY.—John A. Owens, Little Falls, N. Y.

I claim, 1st, Forming the bottoms of the trays of galvanized iron.

2d, Forming the connected ends of each pair of trays with a curve, substantially as described, and for the uses and purposes mentioned.

3d, The partitions, E and F, one or both, for the uses and purposes mentioned.

78,321.—CORN HUSKER.—Thomas Percival, Augusta, Me.

I claim, 1st, The use of the expanding stripper, I, composed of the several stripping tools, as described so arranged that the pressure of the ear will cause them to open to receive it, whether the closing of the same be effected by means of a single elastic rubber spring, or by other means, and whether their cutting edges be straight or toothed, the whole operating in the manner and for the purpose substantially as described.

2d, The butting knife, H, formed of a plate of steel, having through it a round or oval hole or holes, with beveled cutting edges, operating in the manner and for the purpose substantially as described.

3d, The hollow-ended plunger, C, constructed and operating in the manner and for the purpose substantially as described.

4th, The combination and arrangement of parts of a machine for husking corn, when constructed and operating in the manner substantially as described.

78,322.—IGNITING EXPLOSIVE PROJECTILES.—Eugene Pertuiset, Auguste Mundel, and Jean Etienne Armide de Flèron, Paris, France.

We claim, 1st, An explosive projectile composed of a tube, or equivalent hollow metallic body, filled with a detonating or fulminating compound, which will be ignited or inflamed by the action of the heat developed by the impact or penetration of the projectile, substantially as herein shown and set forth.

2d, The fulminating mixture or composition, substantially as herein specified.

3d, The percussion fuse, for containing the fulminating compound, made substantially as and for the purposes herein shown and set forth.

78,323.—WATCH.—Louis Victor Piguet, New York city.

I claim, 1st, The combination of the knob, h, spring plate, L, and lever, E, operating as herein described, whereby the pressure upon the knob, h, throws the setting mechanism in gear and the winding mechanism out of gear, substantially as herein shown and described.

2d, The arrangement in the watch case of the key, C, having pinion, b, wheel, D, spring lever, E, wheels, F G, shifter plate, L, knob, h, pinions, K J g H and I, all constructed and operating as described, for the purpose specified

3d, The arrangement of the key, C, wheel, D, spring lever, E, pivoted upon the pin, c, of said wheel, and bearing the wheel, F, and the wheel, G, all operating as described, in such a manner that by turning the key, C, in one direction the wheel, F, is bound between the wheels, D G, to wind the watch, and turning the key in the opposite direction releases the wheel, F, and prevents the winding of the watch, as herein shown and described.

4th, The key, C, having the crown gear wheel, b, in combination with the wheels, D F G, spring lever, E, spring arm, L, pinion, K, wheels, J H g h I, as herein described, whereby the watch is wound and set by the same key, independently of each other, as herein shown and described.

78,324.—HORSE HAY FORK.—M. H. Pope, Susquehanna Depot, Pa.

I claim the slotted arm, h, lever, f, both pivoted to the cap, E, of the case B, of hay harpoon, all substantially as shown and described and for the purpose set forth.

78,325.—PATTERN FOR CUTTING OUT SHIRTS.—J. W. Rand, Charlestown, Mass.

I claim, 1st, My improved system of cutting shirts or shirt patterns, the same consisting in the employment or combination of a front plate or pattern, O, a series of yoke plates or patterns, A 1, etc., a back-side plate, S, a front-side plate, R, a sleeve pattern, Q, and a bosom pattern, H, the whole being constructed substantially in manner as set forth, and to be used together as and for the purpose described.

Also, the combination therewith of the series of plates, I I', etc., for cutting out the neck portion of a bosom, as set forth.

Also, the combination of the front plate, O, with one or more yoke plates, A, etc., each of such parts being provided with a scale of measurements or divisions so combined or arranged that the corresponding figures on each indicate the width, respectively for cutting the front and back parts of shirts or shirt patterns of any ordinary size.

Also, a yoke formed with a series of measurements or scale of divisions arranged near each end of it, in manner as set forth.

Also, the front plate, O, provided not only with a scale of divisions, arranged as set forth, but formed with a rectangular bosom space, A B C D, as explained.

78,326.—MANUFACTURE OF HOES.—L. T. Richardson, Clayville, N. Y.

I claim the cavities or recesses, d d, in the blank or pattern of the hoe, in the process of manufacture, substantially as and for the purposes described.

78,327.—MANUFACTURE OF ARTIFICIAL STONE.—James L. Rowland, Milwaukee, Wis.

I claim, 1st, The use of the various kinds of sands, rocks, scorias, and other hard mineral substances, crushed and otherwise treated, as described, and combined with a cement, or a cement and a salt, prepared substantially as set forth.

2d, The use of sand in its natural state, or when it is deprived of its coarser grains, in combination with the improved cement, and with water alone, or with a solution of one or more of the salts herein specified.

3d, The use of native earths, metallic oxides, or other like substances, prepared and combined substantially as described, for the purpose of coloring the stone.

4th, The methods of treating and preparing hydraulic cement for the manufacture of stone, substantially as described.

5th, The use of carbonic acid in the process of hardening manufactured stone, or other articles having lime for its base, substantially as described.

6th, The use of steam in combination with carbonic acid gas, substantially as described.

78,328.—CUTLERY.—Moses Rubel, Chicago, Ill.

I claim the beveled side pieces, B B, having notches in their ends and held in place by the cast metal, C C D D, having lugs, F, fitting in said notches, substantially as set forth.

78,329.—PORTABLE FENCE.—Richard Samuel, Walden, N. Y.

I claim the construction and arrangement of my hurdles, when used in connection with the tie bar, D D, slats, E E, tie bolt, F, and standards, H and I, with the bar, M, all as shown and set forth.

Also, the construction of my brace, having standards, H and I, of uneven length, when used, in connection with the hurdles and tie bar, arranged and constructed as shown and described.

78,330.—MITERING MACHINE.—J. J. Sanders, Jr., N. Y. city.

I claim, 1st, the block, C, attached to the saw, D, for the purpose of holding the planing knives, E, all constructed, arranged, and operating as described, for the purpose specified.

2d, The adjustment of the planing knives, E, in the block, C, by means of the inclined grooves, c, nut, F, and screw bolt, d, all constructed, arranged, and operating as described, for the purpose specified.

78,331.—MAIL CAR AND MAIL BAG RECEIVER.—William G. Sanford, Union City, N. Y.

I claim, 1st, In combination with a car, A, a sliding section, B, and trap door, C, for delivering the mail, when said door is disengaged by an arm, D, actuated by a post on the side of the track, and so arranged that in falling it shall form a chute, to direct the bags in failing away from the track, substantially as described.

2d, The combination and arrangement of the sliding section, B, the trap door, C, and slide, F, for simultaneously discharging and receiving the mail, substantially as described.

78,332.—STONE BREAKER.—Hiram H. Scoville, Chicago, Ill.

I claim the fixed central column, C, with its corrugated faces, in combination with the corrugated faces on the oscillating hopper, D, the arm, K, the shaft, H, with its eccentric or crank, all arranged and operating substantially as herein described.

78,333.—WINDMILL.—Hiram M. Shaw and Geo. G. Tindall, Fremont, Ohio.

We claim, 1st, The rods, f, when provided at their outer ends with the cross, h, in combination with the disk, H, and weighted arm, g, whereby, as the disk is raised, the cross, h, is changed from a vertical to a horizontal position, to render the sails inoperative, as herein shown and described.

2d, The combination of the pivoted trough, J, rod, m, disk, H, weighted arms, g, eye, F, rods, f, cross, h, and hinged sails, A, all arranged as described for the purpose specified.

78,334.—CLAMP FOR HOLDING LEATHER TO THE CURRIER'S BENCH.—John Shimer, Bronson, Mich.

I claim, 1st, The clamp pincers, B B, as constructed, having a spring catch, D, for holding them, and the hide or leather, on the bench, C, or block, for manipulating, substantially as herein described.

2d, The stirrup or rack bar, E, and lever pawl, f, when applied to clamps, for tanners' and curriers' use, substantially as set forth.

78,335.—HORSE HAY FORK.—A. B. Sprout, Hughesville, Pa.

I claim, 1st, A hay elevating fork provided with a penetrating point, and with rigid barbs, hooks, or spurs, operating substantially as described.

2d, A hay elevating fork having barbs, hooks, or spurs, which are thrust into and withdrawn from the hay, or equivalent material to be raised, by a lateral movement, relative to each other, of the bars to which said barbs or hooks are attached.

3d, A hay fork proved with rigid barbs or hooks, which are covered when the fork is to be inserted in to or released from the hay, and uncovered after the fork has been inserted for raising the hay.

4th, A hay fork composed of bars having a lateral or shear-blade movement relative to each other, a penetrating point, barbs or hooks, and a mechanism or device for operating the bars or hooks, to cause them to seize and hold or release the load, as desired.

5th, Giving to the holding hooks or spurs a lateral and upward movement or thrust, by means of togcle links or levers connected therewith, for the purpose of operating said hooks, substantially as described.

78,336.—COMPOSITE PIPE.—A. P. Stephens, Brooklyn, N. Y.

I claim the combination of a thin, corrugated metallic sleeve with a non-metallic lining, substantially as before set forth.

Also, the combination of a thin, corrugated metallic sleeve with a non-metallic covering, substantially as before set forth.

Also, the combination of a thin, corrugated metallic sleeve with both a non-metallic lining and a non-metallic covering, substantially as before set forth.

78,337.—PRIMING METALLIC CARTRIDGES.—William Tibbals, South Coventry, Conn.

I claim securing the anvil, B, by drawing or forming the shell, A, drawn over it, in the manner shown and described.

78,338.—TAILORS' SQUARE.—Daniel Tierney, New York city.

I claim a tailors' T-square consisting of the cross piece, A, to which the bar or ruler, B, is pivoted, the bar having suitable graduated scales, a b c, and a pointer, d, or its equivalent, and the cross piece being provided with marks, e, or their equivalents, on its surface, and with marks, f, on its front edge, all arranged as set forth, for the purpose specified.

78,339.—PLOW.—Gabriel Utley, Chapel Hill, N. C.

I claim, 1st, Securing the mold board, E, to the plow by means of the dovetailed tongue, e', formed upon its inner side, fitting into a dovetailed groove formed in the forward side of the arm, G, cast solid upon the side of the standard, C, substantially as herein shown and described and for the purpose set forth.

2d, Securing the point, F, to the plow by means of the dovetailed tongue, b', formed upon its under side, and fitting into a dovetailed groove formed in the forward side of the arm, H, cast solid upon the side of the lower part of the standard, C, substantially as herein shown and described and for the purpose set forth.

3d, Connecting the mold board, E, and point, F, to each other by means of the pin, I, passing through the lower part of the said mold board, E, and through the extended end of the tongue, b', substantially as herein shown and described and for the purpose set forth.

4th, The combination of the tongued point, F, tongued mold board, E, grooved arms, H and G, and standard, C, with each other, substantially as herein shown and described and for the purpose set forth.

78,340.—CARRIAGE.—J. D. Van Hoevenbergh, Kingston, N. Y.

I claim the combination and arrangement of the notched side plates, D D, and inclined hooks, H H, for fastening movable seats, substantially as and for the purpose herein specified.

Also, the india-rubber straps, C C, under the springs, B B, secured thereto and arranged in combination therewith substantially as and for the purpose herein set forth.

Also, the brake blocks, F F, balanced by the counter-weights, B B, in combination with the double whiffletree brake bar, N, and sliding tongue, L, substantially as and for the purpose herein specified.

78,341.—WOOD TURNING LATHE.—A. J. Van Ornum, Hartford, Vt.

I claim the sleeve, B, having a square socket, B', and adapted to rotate with and be moved longitudinally upon the center, A, substantially as and for the purpose herein set forth.

78,342.—GLOBE VALVE.—J.B.T.Van Patten, Sing Sing, N.Y.

I claim the construction of valve, C, and hollow spindle, K, and their arrangement with reference to wheel, H, and spindle, E, substantially as described and set forth.

78,343.—BRICK MACHINE.—Lewis M. Van Sickle, Woodbridge, N. J.

I claim, 1st, The operating of the plungers, F, from the vertical shaft, C, through the medium of the slotted arms, J J, the reciprocating frame, H, bars, G F, connected with the bars, I, fitted in the framing, B, and having the the plungers, F, attached to them, substantially in the manner as and for the purpose specified.

2d, The gates, K K, operated as shown, in combination with the dischargers, m, and the plungers, F, all arranged so as to be operated from the shaft, C, in the manner substantially as and for the purpose specified.

78,344.—WOOD CLEAVER.—John Van Winkle, N. Y. city.

I claim a hatchet or cleaver, A, formed or provided with a deadest bar, D, at its forward end, said bar extending below the cutting edge of the tool, and guarding the same from injury when in use, substantially as described.

78,345.—POTATO DIGGER.—George Vowles, New Hudson, Mich.

I claim, 1st, The knife, C, constructed with fingers, C3, and bowed arms, C1, by which it is adjustably attached to the handles, B, and connected also therewith by the braces, F, substantially as described.

2d, In combination with the knife, the adjustable spring, E, for regulating the depth of the cut, substantially as described.

3d, In combination with the knife and fingers, the rake, D, substantially as described.

4th, The arrangement of the tongue, A, handles, B, and cross brace, B', and knife, C, substantially as set forth.

78,346.—FRUIT CAN.—John R. Williamson, Bethlehem, N. J.

I claim, 1st, The cam, D, having the handle, d, and working in grooves, b, that are provided in the sides of the can, when said cam is operating, substantially as described, to hold down the cover of a fruit can, as set forth.

2d, The combination of the cam, A, which has the flange, a, and grooves, b, with the cover, B, elastic, D, and cam, D, all made and operating substantially as herein shown and described.

78,347.—HORSE HAY FORK.—W. D. Wilson, Watertown, N.Y.

I claim, 1st, The levers, k l, in combination with the plug, e, as and for the purpose set forth.

2d, The levers, k l, in combination with the arm, l'', and screw, l''', in manner described.

78,348.—BRICK MACHINE.—John S. Wood, Hartford, assignor to himself and Elisabeth P. Seymour, West Hartford, Conn.

I claim, 1st, The notched bar, H, hinged to the loose arm, h, upon the shaft, G, and serving to connect said arm with the crank, f, substantially as described for the purpose specified.

2d, The lever, i, having lugs, l m, fitted loosely upon the rock shaft, G, and connected with the main driving shaft, in combination with the loose arm, h, crank, f, and hinged rack bar, H, for the purpose of giving motion to the rock shaft, G, substantially as described.

3d, The swinging grate, M, in combination with the sliding gate, N, and the pins, n, all made and operating substantially as herein shown and described.

78,349.—RAILROAD STATION INDICATOR.—J. F. Zacharias, Leesburg, Va.

I claim, 1st, The combination of the apron or band, E, rollers, F G', cord, G, and operating roller, L, substantially as described.

2d, In combination with the foregoing, the supplemental roller or shaft, E, substantially as described.

3d, The arrangement, with the elements in the foregoing first clause, of the pressure rollers, P P, substantially as described.

78,350.—HASSOCK MACHINE.—C. F. Anthony, Chicago, Ill., assignor to himself and John Charters.

I claim the three-part hoop, A B B, whose top, A, is removable, and the lower part, B B, hinged at the bottom, and having a rim, C C, with projecting brads, a a etc., for holding a hassock cover, substantially as and for the purpose set forth.

78,351.—CLOTHES DRYER.—William Arrouquier, Worcester, Mass.

I claim, 1st, The combination, with the side pieces, D D, and end pieces, E E, of the eyes, b b, endless bands or cords, m, pulley supporting pieces, F, and ear pieces, f, substantially as and for the purposes set forth.

2d, The combination, with the hinged and folding clothes-drying frame, of cords, B, or their equivalents, for supporting the same upon the exterior of the window, substantially as and for the purposes set forth.

3d, The combination, with the frame, C, ears, f, and eyes, b b, of the supporting wires or cords, B B, and the fastenings, h, substantially as and for the purposes set forth.

4th, The combination, with the frame, C, and ears f, of the buttons, n, substantially as and for the purposes set forth.

78,352.—APPARATUS FOR CONCENTRATING SULPHURIC ACID.—Daniel Ashworth and Robert B. Eaton, Woburn, Mass.

We claim, 1st, Conducting the steam or vapors from the retorts to the oil of vitriol chamber, for the purpose and in the manner substantially as described.

2d, Cooling the concentrated oil of vitriol and heating the vitriol before its concentration, by passing the same around or through a vessel, I, constructed as described.

3d, Constructing the pan, c, with tubes or flues, d, for the purpose specified.

4th, Conducting the acid from one retort to the other, by means of siphons or tubes, as described.

5th, Constructing the retorts of platinum, or partly of platinum and partly of glass, when the same are arranged in a series and communicate with each other, as set forth.

78,353.—ENVELOPE MACHINE.—James Ball New York city.

I claim, 1st, The arrangement of a revolving gummer, G, having a different velocity from the table which supports the blanks, in combination with the reciprocating table, C, substantially as and for the purpose described.

2d, Giving to the revolving gummer a positive compound rising and falling and revolving motion, substantially as and for the purpose described.

3d, The cam, u, stop, u1, and weight or spring, u2, in combination with the pinions, r r1, on the shaft of the gummer, G, substantially as and for the purpose set forth.

4th, The self-adjusting clamp, x, to act on the pile of blanks, substantially as and for the purpose described.

5th, Giving to the pile of blanks a motion under the gummer, G, and picker, H, substantially as and for the purpose set forth.

6th, The arrangement of an automatic stop motion, composed of the latch, d, and notch in the frame, A, in combination with the gummer and picker, and with the platform, D, supporting the blanks, substantially as and for the purpose described.

7th, The arrangement of distinct strips, N, catching over the edges of the lower creasing box, and attached thereto by set screws, substantially as and for the purpose set forth.

8th, The heels, w2, attached to the folding wings, v2 v2', by one or more set screws, substantially as and for the purpose described.

9th, The spiral carriers, O, to carry the envelopes along, and retain them free from pressure until the gum has dried, when arranged substantially as described.

10th, The combination of two or more sets of spiral carriers, O O', running in opposite directions, substantially as and for the purpose set forth.

11th, Increasing the pitch of the screw threads at the receiving ends of the spiral carriers, O O', substantially as and for the purpose described.

12th, The separator, c5, in combination with the spiral carriers, substantially as and for the purpose set forth.

13th, The reciprocating conveyor, d3, in combination with the spiral conveyors, O O', constructed and operating substantially as and for the purpose described.

14th, The arrangement of a transparent panel or pane, f3, in the receiving table, P, of the envelope machine, substantially as and for the purpose set forth.

78,354.—SELF-CLINCHING SPIKE.—James Balmer (assignor to himself and Wm. Greenleaf), Brooklyn, N. Y.

I claim a spike split or divided longitudinally, and having its split sides so beveled or inclined that when driven into the wood the portions on the opposite sides of the split or cleft will diverge in opposite directions, parallel with the split or cleft, substantially as herein described.

78,355.—SPRING CATCH AND STOP FOR DOORS.—Charles W. Barnes, Janesville, Wis. Antedated May 19, 1868.

I claim knob, A, metallic springs, C, rubber seat, E, and staple, D, connected to a door, when the whole are constructed and used substantially as and for the purposes described.

78,356.—PERPETUAL CALENDER.—Simeon L. Barinds, St. Joseph, Mo.

I claim, 1st, The combination of the cardboard, E, and dials, D B, having letters and figures marked on them, substantially as and for the purpose set forth.

2d, The combination of screw wheels, F G, screws, H I, and dials, D B, substantially as set forth.

78,357.—SAW-SET.—Francis Bates, Niles, Mich.

I claim a saw-set consisting of the frame, A, provided with the jaws, B, and set screws, b, for holding the saw, and having the lever, E, arranged to operate therein, substantially as shown and described.

78,358.—INKING APPARATUS FOR PRINTING PRESSES.—Thos. L. Bayliss, Richmond, Ind.

I claim, 1st, The inking slats, e e' and e'', hinged and so arranged in sets as to occupy the same horizontal plane, and also to admit of their being separated and brought in contact with different colored inking rollers, substantially as described and for the purpose set forth.

2d, The grooves, t t' and t'', in the sides of the frames, in combination with the inking slat frames or their equivalents, by which said inking slats are directed against the surfaces of their respective inking rollers, substantially as described and for the purpose set forth.

78,359.—WINDOW BLIND.—Wm. Bellairs and Henry Demott, Atkinson, Ill.

We claim the arrangement of the slats, A A, and folding bar, B, in casing, C, arranged either outside or inside of the window, and operating by means of the cords, D and F, and loaded tassels, E and G, substantially as and for the purposes above set forth.

78,360.—MACHINE FOR GRANULATING AND FINISHING TOBACCO.—Nicholas H. Borgfeldt and Frederick W. Sutterhoff, New York city.

We claim in a device for granulating and finishing tobacco, the arrangement of the spiral brushes, cylindrical sieve, B, conveyor screw, E, cylindrical sieve, D, and the discharges, F G, when constructed and operating as herein described.

78,361.—ALPHABET TOY.—Robert J. Clay, Flushing, N. Y.

I claim, 1st, A traveling alphabet, preferably of pictorial character, operated automatically, by means of clockwork, within a stand or case, by causing the same to wind and unwind intermittently on and off drums, and so as to expose but a letter at a time, substantially as specified.

2d, In combination with an intermittently traveling alphabet apron, operated automatically as described, the bell, R, struck to indicate the changes made in the exposure of the letters, essentially as herein set forth.

3d, The combination of the alphabet apron, C, drums, D E, spoke driving wheels, F G, bell, R, with its hammer, e, and clock or watch work, all arranged within a stand or case, having a partially transparent front, for operation as described.

78,362.—COTTON PICKER.—Robert F. Cooke, Newark, N. J.

I claim, 1st, Opening the bolls of cotton plants and disengaging the cotton rom the bolls by means of knocking or shaking the cotton plant, as set forth and specified.

2d, The arrangement of flails, d, at the lower end of a revolving shaft operating the cotton plant, in the manner and for the purpose substantially as set forth.

3d, In combination with a shaking device which loosens the cotton from the boll, the use of a blast of air to blow the thus loosened cotton into a receiver, substantially as described.

4th, The blast opening, J, in combination with the screen or receiver, F, said opening and receiver extending nearly from the top to the bottom of the cotton plant, in the manner and for the purpose set forth.

5th, The trough, G, provided with an endless conveyer belt, L, to convey the cotton from the receiver, F, to the after part, or to any other desired part of the machine, constructed, arranged and operated substantially as set forth.

6th, The guid s, V and W, or their equivalent, arranged and constructed so as to lift up the lower branches of the cotton plant, and to guide the plant, in the manner and for the purpose substantially as set forth and described.

78,363.—PARING KNIFE FOR BOOTS AND SHOES.—William De Camp (assignor to himself and A. R. E. Frick), Newark, N. J.

I claim the handle, A, guide piece, y, adjuster, V, wedge, C, knife, B, and the screw, S, all combined, constructed, and arranged substantially in the manner and for the purpose specified and shown.

78,364.—HARNESS BUCKLE.—P. S. Crawford, Rockford, Ill.

I claim as an article of manufacture the circular frame, A, having tongue, B, of tapering form, hinged to bars C C, D or D, substantially as shown and set forth.

78,365.—CHANDELIER.—John A. Evarts (assignor to Bradley & Hubbard), West Meriden, Conn.

I claim, 1st, The flange, A, combined with the parts, B and C, and constructed so as to receive and hold the arms, E, substantially in the manner described.

2d, The arrangement of the pulleys, b, upon their arms, G, when the said arms are secured in the base, F, substantially in the manner and for the purpose set forth.

3d, The weight, consisting of the two parts of the case, H and I, secured together by the bolt, L, and nut, N, and provided with adjustable weights, P, substantially in the manner herein set forth.

78,366.—COVERED DISH.—W. A. Fenn, West Meriden, Conn.

I claim the arrangement of the sleeve, d, upon the trunnion, C, and combined with a bearing, a, which said bearing is provided with an open slot, the whole constructed and arranged to operate in the manner set forth.

78,367.—WAIST BELT OR GIRDLE.—M. Isadora Findley, New York city. Antedated May 15, 1868.

I claim the detached buckle, B, with its knob or button-shaped projections, d, in combination with the perforated ends of the belt, for use substantially as shown and described.

78,368.—CHURN.—Isaac N. Frost, Peoria, Ill.

I claim, 1st, The dashers, G G, propelled by a crank, in connection with the sliding plate through which they pass, substantially as shown.

2d, The sliding plate, A A, to close the slot in the top, as shown.

3d, The slot covered with a movable plate, through which the dasher may pass, substantially as shown.

78,369.—HAY CUTTER.—Frederick Gerfen, West Hempfield Township, Pa.

I claim the hay cutter, constructed and arranged substantially as and for the purpose specified.

78,370.—COMBINATION OF A PUDDLING FURNACE WITH A STEAM GENERATOR.—George William Hawksley and Matthew Wild, Sheffield, Eng.

We claim the furnace, e, and boiler, a, constructed as described, the former being located within the latter, in such manner as to be wholly surrounded by water, the arrangement being such that the heat of the furnace generates the steam of the boiler, as shown and described.

78,371.—CAR BRAKE AND STARTER.—Michael Henderson, Detroit, Mich.

I claim the longitudinal bars, K, shafts, D and O, when connected with the bar, G, and operated by the lines or chains, L, secured by ratchets and pawls X, substantially as and for the purpose set forth.

Also, the combination of the above named parts with the parallel longitudinal rods, H, provided with spiral springs, 6, sleeves, J, and connecting bar, T, the line or chain, l, cylinder, E, and shifting bar, G, when arranged and operating substantially as herein set forth.

78,372.—POLISH FOR LEATHER.—John Herold and Mercer Brown, Frederick, Md.

We claim the within-described mixture, when compounded and used substantially as and for the purpose herein set forth.

78,373.—VEGETABLE AND FRUIT SLICER.—Elijah Holmes, Lynn, Mass.

I claim 1st, The combination of the knife, H, the bar, F, the arm, 1, the nut, J, and the spring, d, or their mechanical equivalents.

2d, The combination of the several parts, as above described, so that several knives shall be controlled and adjusted by a single screw or nut, for the purposes and in the manner substantially as above set forth.

78,374.—SKIRT FORMER.—F. Hull, Birmingham, Conn.

I claim the arrangement of the adjusting bar, G, pivoted to the front arms, and provided with the bars, H, I and L, corresponding to the other arms of the form, the whole constructed so as to be adjusted by the raising or lowering of the bar G, substantially as and for the purpose specified.

78,375.—MANUFACTURE OF SODA AND POTASH.—A. G. Hunter, Flint, Great Britain.

I claim the process of converting silicate of soda or silicate of potash into the corresponding carbonate, by double decomposition with bicarbonate of lime, as substantially described herein.

78,376.—MACHINE FOR STRAIGHTENING TOBACCO.—Jerry A. Hunter, New London, Va.

I claim the funnel-shaped brush, and the upright, self-acting rollers attached.

78,377.—STEAM HEATER.—P. F. Kessler and John Carlisle, Dayton, Ohio.

I claim, 1st, The metallic plates, D, and the case, E, in combination with the shells, A, in radiators, as and for the purpose set forth.

2d, The arrangement of the shells, A A, pipes, b b, partitions, a a, nipples, B B, steam pipe, C, and case, E, when the several parts are constructed and operated substantially as and for the purposes set forth.

78,378.—LANTERN.—Thomas Langston (assignor to E. Miller & Co.), Meriden, Conn.

I claim the combination of the lamp socket, A, with the lower guard flange C, when the said guard flange is provided with one or more internal projections, f, and the set screw, G, so as to secure the said socket to the flange, substantially in the manner herein set forth.

78,379.—MACHINE FOR BEAMING HIDES.—Patrick Lennox, Lynn, Mass.

I claim, 1st, In a machine for beaming hides, or sleeking or dressing leather, actuating the movements of the working tools by means of the connecting rod, g, and eccentric rod, h, the former being pivoted at one end to the sliding carriage, and the latter to the beaming-tool carrier, and both being connected with the balance wheel by the means above described, the whole being arranged and operating as before described.

2d, The application of the elastic apron to the revolving tablet, in manner and for the purposes as hereinbefore explained.

3d, Applying the revolving tablet to the car truck frame in such manner as to be enabled to adjust its vertical positions, essentially as herein shown and described.

4th, The means for accomplishing this vertical adjustment of the revolving tablet, the same consisting of the cross frame, o, and treadle, p, combined and arranged and operating as before explained.

5th, The inclination of the outer end of the horizontal beam or guide for elevating the beaming tool substantially as before explained.

78,380.—MACHINE FOR BEAMING HIDES.—Patrick Lennox, Hiram H. Robbins, and Edward Hayes, Lynn, Mass.

We claim, 1st, In a machine for beaming hides or dressing leather, a device so constructed and applied thereto as to automatically press upon or clamp the hide to its supporting table, and hold it in position under the action of the beaming tool, in order to manipulate the hide at one operation.

2d, As a device for accomplishing the above result, the combination and arrangement of the brake bar, g, with the vibrating levers, e e, such levers being pivoted to the guides, b b, and actuated by the wipers, u u, and operating in connection with the beaming tool, essentially in manner and for the purpose as set in shown and described.

3d, The mode of suspending the beaming tool from the sliding carriage, c, that is, by means of the plate or bracket, j, posts, l l, and springs, k, etc., substantially in manner and for the purpose as herein shown and described.

4th, The arrangement or disposition of the twin cranks, e e, as supported by the shafts, f f, and carrying between them the two rods, d and n, and the eccentric, p, essentially as herein set forth and explained.

78,381.—RUNNING CORNICE.—Alexander Leverty, Bridgeport, Conn.

I claim molds or forms for running stucco cornices, constructed in the manner herein described, so as to form complete the moldings into the internal angles, substantially as set forth.

78,382.—WATCH KEY.—Wm. Lindon, New Haven, Conn.

I claim a key provided with a sheath, B, the upper end of which is slitted so as to form springs to secure the sheath to the key, substantially as set forth.

78,383.—GRAIN CAR.—W. A. Long and J. E. Lavey, Plymouth, Ind.

We claim the arrangement of the boxes, A A, with the revolving gate, C, between, and rack bars, D D, shafts, g, and cog wheels operated by the levers, j, and placed at the outer ends of the boxes, substantially as and for the purposes specified.

78,384.—SHOE.—Robert O. Lowrey, Salem, N. Y.

I claim a waterproof shoe or covering for the foot, when manufactured of cloth, paper, or leather, made waterproof by my patented process herein mentioned, or of either of these materials, or of any combination of the same, substantially as herein described, as a new article of manufacture.

78,385.—BOOT AND SHOE.—Nicholas Lunsden, San Francisco, Cal.

I claim, 1st, The regulating guide, consisting of the sliding rod, L, and its adjustable nut, M, together with the screw plate, I, and the wire-holding clamps, the whole constructed and operating substantially as and for the purpose describ-d.

2d, The adjustable last standard, constructed and operating substantially as and for the purpose described.

3d, The device consisting of the spring, W, rod, V, cylinder, g, and barrel, h, for obtaining a perpendicular motion of the last, and a pressure against the screw plate, substantially as and for the purpose described.

78,386.—COFFEE ROASTER.—Benj. K. Maltby (assignor to Thomas N. Drake), Cincinnati, Ohio.

I claim a coffee roaster provided with an axle or shaft, to which paddles, acting as inclined planes, and combined with elastic plates, are attached, and which revolves within a stationary semi-cylindrical bed, the whole being constructed, arranged and operated substantially in the manner and for the purpose described.

78,387.—HOLDER FOR LATHE PLANER.—Joseph P. Manton, Providence, R. I.

I claim a tool holder, constructed substantially as herein described.

78,388.—MACHINE FOR DRESSING BRICKS.—James McNamara, Buffalo, assignor to himself and C. D. Page, Rochester, N. Y. Antedated May 18, 1868.

I claim, 1st, Alternately arresting and releasing the endless carrier, B, by means of the lever, J, winch, and arm, q r, spring, u, and wedge, t, arranged and operating substantially as set forth.

2d, The hinged plates, g g, and springs, j j, in combination with a vertically sliding frame for operating them, substantially in the manner and for the purpose specified.

3d, In combination therewith, the end plates, m m, rods, n n, and springs, p p, arranged and operating substantially as and for the purpose set forth.

4th, The combination of the plates or platens, g g, m m and w, for dressing brick by simultaneously pressing it on all sides, when operated substantially in the manner specified.

5th, The machine, as a whole, constructed, arranged, and operating substantially as set forth.

78,389.—GATE.—Levi Miller, Johnsville, Ohio.

I claim the construction of a farm gate, in the manner as herein described and represented.

78,390.—PLOW.—H. Walker Neal, Sydney, Ohio.

I claim, 1st, The lever, E, pivoted upon the main axle, as set forth, for raising and lowering the wheel, A'.

2d, The combination of the levers, E and E', notched flange, e2, and spring, e3, for the purpose of holding the wheel, A', in desired position.

3d, The combination of the tongue, B, lever, G, clevis, H, and plowbeam, C, arranged and operating as and for the purpose set forth.

78,391.—BOILER FOR MAKING MAPLE SUGAR.—Gaius L. Parker, Coventryville, N. Y.

I claim the cast iron heads, B B, with narrow flanges extending outward, so that the sheet metal, A, may be bent or stamped to conform to the shape of the heads, and thereto be riveted to the flanges, all constructed and used as specified.

78,392.—SUN DIAL.—H. C. Pearsons, Ferrysburg, Mich.

I claim the combination of the polar dial, A, and the equatorial dial, B, with the semi-cylinder, C, when employed instead of a plane surface for the equitorial dial.

78,393.—FIRE PLUG.—John H. Rhodes, Brooklyn, N. Y.

I claim the hydrant, having its lower end working on a universal joint communicating with the water main, and its upper end sustained by suitable springs, substantially as and for the purpose specified.

78,394.—BAGGAGE CHECK.—H. Schuyler Ross, Buffalo, N. Y., assignor to Charles G. Ross, New York city.

I claim, 1st, The combination of a baggage check, containing many names and perforations, with a separate and detachable pointer or indicator, substantially as herein specified.

2d, A detachable metallic index or pointer, so constructed as to securely retain a given position upon a baggage check, containing many names and perforations, substantially as and for the purpose specified.

78,395.—STEAM WATER INJECTOR.—H. Schuyler Ross, New York city, assignor to Charles G. Ross and Henry B. Eells. Antedated May 14, 1868.

I claim, 1st, The arrangement of the water pipe or conductor, E, in such relation to the steam pipe or jet, C, that the discharge end of such water pipe shall open or discharge within the steam pipe or jet, substantially as herein specified.

2d, The arrangement of the water pipe or conductor, E, so that by a longitudinal movement of the said water pipe or conductor the flow of steam from the steam pipes or jet, C, may be entirely shut off or regulated, substantially as herein specified.

78,396.—HAND SEED SOWER.—E. W. Sanderson and W. A. Shattuck, Hillsboro county, N. H., assignors to themselves, Benj. Whiting and H. J. Miller.

We claim, 1st, The cylinder, A, with grooves and straps, D, made and arranged and operating with screw, F, substantially as and for the purposes set forth.

2d, The arrangement of the plow, G, with spring, H, arranged and operating substantially as and for the purposes above set forth.

78,397.—SPRING BED BOTTOM.—Alvah L. Sawyer and Wilson Baldwin, Detroit, Mich.

We claim the combination of the transverse bars, A A and F F, the longitudinal bars, B B and E E, with the fulcrum blocks, C C C C, the crotched, transverse spring, D, and the slats, H H H, etc., when constructed, arranged, and operating substantially as herein set forth and shown.

78,398.—CHUSN.—Augustus Schuffert and George Cooper, Wyandotte, Mich.

We claim the combination and arrangement of the shafts, B and E, together with the wheels, C and D, and the casher, operating as and for the purpose above described.

78,399.—APPARATUS FOR MEASURING CLOTH.—Caleb L. Shotwell, Allamuchy, N. J.

I claim, 1st, The combination with an apparatus constructed substantially as described, for measuring cloth in the roll or piece, of a dial or indicator, substantially as described.

2d, The combination with a cloth measuring device of a reel, cord and dial, substantially as described and for the purpose set forth.

3d, The measuring apparatus, constructed as described and shown by the drawings.

78,400.—METHOD OF MOUNTING THE CUTTERS OF ROTARY PLOWS.—Philander H. Standish, Martinez, Cal.

I claim, 1st, The revolving hubs, E E, and the supporters, F F, constructed and operating substantially as and for the purpose described.

2d, A flexible or yielding arm, having the spring, G, or its equivalent, together with the rotary cutter, substantially as and for the purpose described.

78,401.—MACHINE FOR GRINDING THE CUTTERS OF MOWING MACHINES.—Anson P. Thayer, Syracuse, N. Y.

I claim, 1st, A portable grinding mechanism for grinding the cutters of mowing machines, provided with a bench forming a seat for the operator, substantially as and for the purpose described.

2d, A mowing machine grinding wheel provided with means for pressing it upon the cutter blades with a yielding pressure, substantially as and for the purpose described.

3d, The combination of the vertical extensions, C1 and C3, of the frame, C, with the bench, substantially as and for the purpose described.

4th, The mechanism of a portable cutter grinding machine, constructed substantially as described, in combination with driving mechanism arranged for the application of both hands of the operator to the driving shaft, substantially as and for the purpose described.

5th, The combination with the frame, C, and the swinging frame, D, of the screwed sleeve, H, provided with a swivel joint, substantially as and for the purpose described.

6th, The combination of the oscillating frame, D, with the feeding screw, E, arranged within the frame, and serving as the axial support of the same, substantially as and for the purpose described.

7th, The rotating feed screw in combination with the sliding frame, grinding wheel, and its operative mechanism arranged with the screw, substantially as and for the purpose described.

8th, The combination of the frame, C, with the adjustable sleeves, a1 and a2, posts, B1 and B2, and the bench, A, substantially as and for the purpose described.

9th, The combination of the frame, C, with the sleeve, a2, post, B2, provided with the spiral spring, b2, and adjustable rings, b and b1, substantially as and for the purpose described.

10th, The combination with the frame, C, of the crank shaft, C2, vertical shaft, I, and screw shaft, E, provided with the connecting gear wheels, substantially as and for the purpose described.

78,402.—STUMP EXTRACTOR.—E. W. Tibbels, Chester, Pa.

I claim the combination of the wheeled draft axle, A, the drag bar, D, and the lever, E, with the chain and the dog attached thereto, for operation, substantially as and for the purpose specified.

78,403.—LOCK BAR FOR BRIDGES.—L. E. Truesdell, Chicago, Ill.

I claim the corrugated ends of two or more bars of iron, A and A2, B and B2, when firmly held together within the compressible sides of fluted clamp plates, C, D and E, as and for the purpose specified.

78,404.—RAILROAD RAIL.—Z. B. Wakeman, Rockford, Ill.

I claim the combination of the hollow shell rail, A, with its interior notches, and the block, B, when connected thereto by the wedge-shaped key, C, all constructed as specified.

78,405.—STAKE HOLDER FOR CARS.—Wm. P. Wentworth (assignor to himself and Thomas S. Sprague), Detroit, Mich. Antedated May 16, 1868.

I claim the combination and arrangement of the stake, A, the cap or socket, B, the strap, C, the hinge joint, E, the button, F, the slot, G, the pins, H and I, and the bevel, K, arranged and described, or any other substantially the same, for the purpose designed.

78,406.—DUST PAN.—L. F. Wheaton, Madison, Conn.

I claim a dust pan having the pans, a, arranged near its handle edge, so as to elevate and hold the pan, substantially in the manner and for the purpose described.

78,407.—WOOL BOX.—Carmi Wightman, Batavia, Ill.

I claim the leaves, C C, D D, bed, I, frame, A B, guides, F F, cross piece, N, in combination with lever, K, pulley, P, and cord, M, the whole being constructed and arranged to raise and lower said leaves, substantially as set forth.

78,408.—PHOTOGRAPHIC CAMERA.—Simon Wing, Boston, Mass.

I claim, 1st, The self-adjusting partition, C, so acting as to be in contact with the diaphragm in all positions of the lenses, without interfering with the adjustment of the latter, substantially in the manner and for the purpose described.

2d, In combination with a sliding shut-off, the handle, G, constructed and operated in the manner and for the purpose set forth.

78,409.—OINTMENT.—Mrs. H. T. Wood, San Francisco, Cal.

I claim the above-described composition for ointment, made of the ingredients enumerated, mixed or compounded in about the proportions specified.

REISSUES.

2,943.—NECK TIE.—Herman Bendix (assignee of Herman Bendix and J. H. Fleisch), New York city. Dated March 13, 1866.

I claim a fastening device for neck tie, consisting of a hook, a, elastically secured to its holder or retainer, substantially as described.

2,944.—MELODEON.—La Fayette Louis, Providence, R. I.—Dated Nov. 18, 1856. Reissue 2,498, dated Feb. 26, 1867.

I claim in combination with the reeds of a melodeon (or that class of instruments in which the air is drawn through the reeds by the exhaust action of a bellows), a tremolo valve or valves, so arranged that when vibrated it or they shall interrupt the passage of air through the reeds, and thereby produce the tremolo sound, at the will of the performer.

Also, in combination with the reeds of a melodeon, a tremolo valve, actuated by a rotary fan or blade wheel, substantially as described.

Also, in combination with the reeds of a melodeon, a tremolo valve or valves, having a positive connection with the valve actuating mechanism, substantially as described.

2,945.—FENCE POST.—Robert Ramsey, New Wilmington, Pa. Dated Dec. 10, 1867.

I claim, 1st, The compensating features of the posts, whether effected by the formation of the gains or by keys, substantially as and for the purpose set forth.

2d, The combination of posts, P P' P'', when provided with square or dovetail gains, with sills, A A', and keys, e e e e, substantially as and for the purpose specified.

2,946.—SKIRT HOOP.—E. Wooster and Company, and F. Hull and Company, Birmingham, Conn., assignees of John R. Latin. Dated April 30, 1867.

We claim the bottom hoop for hoop skirts, formed by combining one or more springs in a single cover, the upper edge of which is formed as described, so as to be secured to the tapes of a skirt, as and for the purpose set forth.

2,947.—COMPOUND FOR TREATING HIDES AND SKINS.—L. F. Robertson, West Farms, N. Y. Dated April 21, 1868.

I claim a compound for treating hides and skins, made of the materials herein described.

2,948.—STEERING APPARATUS.—Charles H. Sawyer, Buxton, Me. March 31, 1868.

I claim the apparatus as herein described, having the wheel shaft, B, with its right and left screw, d, the two small double gears, a b, and larger gear, D, with the teeth on the inner periphery thereof, substantially as and for the described purposes.

2,949.—PUMP.—Wm. Shoup, Saltsburg, Pa. Dated Dec. 27, 1864. Antedated April 26, 1862.

I claim, 1st, The combination with the pump tube, B, of the outer tube, C, and seed bag, F, placed around outside of it, irrespective of the gate or valve, D, substantially as and for the purpose hereinbefore described.

2d, The gate or valve, D, in combination with the tube, C, and pump tube, A, arranged as described, for the purpose set forth.

2,950.—INVALID BEDSTEAD.—Wm. Heath, Bath, Me. Dated March 10, 1868.

I claim the combination of the recesses, K K, L L, or their equivalents, with the frame, A, the two frames, D E, and mechanism for moving and depressing, or operating the back frame, E, substantially as described.

Also, the combination of the folding legs, M M, with the arms, h h, or their equivalent, the toothed sectors, their arms, f f, the frame, A, and the parts, B C D E, arranged and connected substantially as described.

2,951.—COMBINED RAKE AND REEL FOR HARVESTER.—Sam'l Johnston, Buffalo, N. Y., assignee by mesne assignments of himself.—Dated Feb. 7, 1865.

I claim, 1st, In combination with a series of revolving arms carrying heads or rakes which all gather the grain, and a part only of which discharge the grain, so constructing and arranging a camway as to cause all the heads or beaters to descend to the same gathering level in front of the cutters, and then to elevate those which do not discharge above the cut grain on the platform, and above the level pursued by the discharging head or rake.

2d, In combination with a series of revolving arms carrying heads or rakes which all gather the grain, and a part only of which discharge the grain, a cam so arranged as to cause all the heads or beaters to descend to the same gathering level in front of the cutters, and then to rise above the cut grain on the platform, and above the level pursued by the discharging head, or the teeth thereof, movable, so as to permit any one of said rakes or heads to descend while passing the platform, and become a discharging rake or head.

3d, In combination with a series of revolving arms carrying heads or rakes which all gather the grain, and a part only of which discharge the grain, and a cam so arranged as to cause all the heads or beaters to descend to the same gathering level in front of the cutters, and a device for throwing those heads, or the teeth thereof, which do not discharge, above the cut grain while passing the platform and above the level pursued by the heads, or the teeth thereof, which do discharge the grain, making the said last mentioned device movable, so as to permit any one or more of said heads, or the teeth thereof, to descend to the level of the platform and discharge the grain.

4th, In combination with the movable device set forth in the last claim, a cord, or equivalent connection, extending to the driver's seat, for operating the said device, so as to regulate the rise of the gavel at the will of the driver.

5th, In combination with a series of revolving arms carrying heads or rakes which all gather the grain, and a part only of which discharge the grain, and a cam so arranged as to cause all the heads or beaters to descend to the same gathering level in front of the cutters, and then to elevate those which do not discharge above the cut grain on the platform and above the level pursued by the discharging head or rake, an auxiliary cam way for guiding and controling the arm or the rake or head which discharges the grain while said arm is passing the platform.

6th, In combination with a series of revolving arms carrying heads or rakes which all gather the grain, and a part only of which discharge the grain, and a cam so arranged as to cause all the heads or beaters to descend to the same gathering level in front of the cutters, and a device for throwing those heads, or the teeth thereof, which do not discharge, above the cut grain while passing the platform, and above the level pursued by the heads, or the teeth thereof, which so discharged the grain, an auxiliary cam way opposite to the plat for guiding and controling the arm of the rake or head which also discharges the grain.

8th, The overhanging extension attachment to the heads or beaters, in combination with the outer divider and rim of the platform.

9th, The combination of the elbow of the rake arm with the roller and the outer and inner tracks or ways, constructed substantially as described and for the purposes set forth.

2,952.—MODE OF PRINTING PHOTOGRAPHIC PICTURES.—Isaac Rehn, Philadelphia, Pa. Dated April 14, 1868.

I claim the combination of the silver, the albumen, and the salt, with a pigmentary substance, to give increased sensitiveness and consistency to the photographic compound, substantially as described.

2,953.—WATCH.—O. F. Stedman, Ravenna, Ohio. Dated Jan. 28, 1868.

I claim the ring or band, C, bevelled or made thin at one edge or side, said band being made narrower than the movement, and wide enough to cover the space between the plates, a and b, substantially as and for the purposes herein set forth.

2,954.—FIRE ENGINE.—The Gould Machine Co. (assignees by mesne assignments of John N. Dennisson), Newark, N. J. Dated Feb. 7, 1865.

We claim, 1st, A force pump, which may be adapted to throw a larger or smaller quantity of water at each stroke, by varying the effective area of its piston surface, by means substantially as herein set forth.

2d, A force pump, provided with one or more ports or passages, the opening of which will relieve a part of the piston surface from labor or pressure on the water, so that the whole power of the motor can be applied to the water delivered from the pump by the operative part of the piston, substantially as described.

3d, Increasing or diminishing the effective area of the pump or pumps by means of a valve placed in the partition between them, so that the quantity of water discharged at a stroke can be increased or diminished at pleasure, without altering the speed or stroke, substantially as described.

2,755.—BUCKLE.—The West Haven Buckle Co., West Haven, assignees of Sheldon S. Hartshorn, Orange, Conn. Dated November 7, 1854.

We claim, 1st, A buckle, in which the tongues are formed from a single piece of metal, and constructed so as to clasp the divided side, and turn freely thereon, substantially in the manner herein set forth.

2d, The combination of the two parts or loops, one side of one of which is divided and the two parts or loops hinged together, as described, and the tongue clasped and hinged upon the divided side substantially as set forth.

DESIGNS.

3,049.—CUPBOARD LATCH.—S. D. Arnold (assignor to P. and F. Corbin), New Britain, Conn.

3,050.—COOK'S STOVE PLATE.—D. S. Colby and Robert Scorer, Troy, N. Y.

3,051.—PARLOR STOVE PLATE.—D. S. Colby and Robert Scorer, Troy, N. Y.

3,052.—TRADE MARK.—G. P. Farmer, Philadelphia, Pa.

3,053.—SPOON OR FORK HANDLE.—Alonzo Hebbard (assignor to Edward Corning), New York city.

3,054.—TRADE MARK.—G. W. Waitt, Philadelphia, Pa.

3,055.—COOKS' STOVE.—J. J. Anderson, Rochester, Pa.

3,056.—COOKS' STOVE.—T. S. Mitchell, Pittsburgh, Pa.

3,057.—FRAME OF A SCHOOL DESK AND SEAT.—H. M. Sherwood, Chicago, Ill.

3,058.—PLATES OF A COOK'S STOVE.—Garrettson Smith and Henry Brown (assignors to Abbott & Noble), Philadelphia, Pa. Antedated May 5, 1868.

3,059.—ILLUMINATING RING FOR GAS STOVES.—Garretson Smith and Henry Brown (assignors to Abbott & Noble), Philadelphia, Pa. Antedated May 5, 1868.

3,060.—WATER-CLOSET RECEIVER.—Wm. Smith, San Francisco, Cal.

Inventions Patented in England by Americans.

[Compiled from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

1,257.—SECURING TUBES IN STEAM BOILERS, ETC.—Geo. P. Hunt, New York city. April 17, 1868.

1,266.—MANUFACTURE OF HATS AND BONNETS.—Chauncey O. Crosby, New Haven, Conn. April 18, 1868.

1,270.—MACHINE FOR TURNING OFF CROSS-HEAD WRIST PINS, CRANK PINS ETC.—Theodore A. Goff, San Francisco, Cal. April 18, 1868.

1,288.—CONSTRUCTION OF RINGS FOR RING SPINNING.—Cyrus B. Morse, Rhinebeck, N. Y. April 20, 1868.

1,307.—APPARATUS FOR STAMPING, DATING, INDICATING, AND CANCELING MARKS OR DESIGNS.—Edward Chamberlain, New York city. April 22, 1868.

1,315.—MACHINERY FOR MANUFACTURING SMALL ARTICLES FROM SHEET METAL.—Lauriston Towne, Providence, R. I. April 22, 1868.

1,316.—CARPET LININGS, AND MACHINERY FOR MANUFACTURING THE SAME.—Geo. W. Chipman, Boston, Mass. April 22, 1868.

1,318.—PADDLE WHEEL FOR VESSELS.—Donald L. McDonell, Detroit, Mich. April 22, 1868.

1,339.—CARTRIDGE BOX OR HOLDER.—Paul F. Schneider, Hartford, Conn. April 23, 1868.

PATENTS.

The First Inquiry that presents itself to one who has made any improvement or discovery is: "Can I obtain a Patent?" A *positive* answer can only be had by presenting a complete application for a Patent to the Commissioner of Patents. An application consists of a Model, Drawings, Petition, Oath, and full Specification. Various official rules and formalities must also be observed. The efforts of the inventor to do all this business himself are generally without success. After a season of great perplexity and delay, he is usually glad to seek the aid of persons experienced in patent business, and have all the work done over again. The best plan is to solicit proper advice at the beginning.

If the parties consulted are honorable men, the inventor may safely confide his ideas to them; they will advise whether the improvement is probably patentable, and will give him all the directions needful to protect his rights.

Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN, have been actively engaged in the business of obtaining patents for over twenty years—*nearly a quarter of a century*. Over Fifty Thousand inventors have had benefit from our counsels. More than one third of all patents granted are obtained by this firm.

Those who have made inventions and desire to consult with us are cordially invited to do so. We shall be happy to see them in person, at our office or to advise them by letter. In all cases they may expect from us an *honest opinion*. For such consultations, opinion, and advice, *we make no charge*. A pen-and-ink sketch, and a description of the invention should be sent, together with stamps for return postage. Write plainly, do not use pencil nor pale ink; be brief.

All business committed to our care, and all consultations, are kept by us *secret and strictly confidential*. Address MUNN & CO., 37 Park Row, New York.

In Order to Apply for a Patent, the law requires that a model shall be furnished, not over a foot in any dimensions—smaller if possible. Send the model by express, pre-paid addressed to Munn & Co., 37 Park Row, New York, together with a description of its operation and merits. On receipt thereof we will examine the invention carefully and advise the party as to its patentability, free of charge.

The model should be neatly made of any suitable materials, strongly fastened, without glue, and neatly painted. The name of the inventor should be engraved or painted upon it. When the invention consists of an improvement upon some other machine, a full working model of the whole machine will not be necessary. But the model must be sufficiently perfect to show, with clearness, the nature and operation of the improvement.

New medicines or medical compounds, and useful mixtures of all kinds, are patentable.

When the invention consists of a medicine or compound, or a new article of manufacture, or a new composition, samples of the article must be furnished, neatly put up. Also, send us a full statement of the ingredients, proportions, mode of preparation, uses, and merits.

Reissues.—A reissue is granted to the original patentee, his heirs, or the assignees of the entire interest, when by reason of an insufficient or defective specification the original patent is invalid, provided the error has arisen from inadvertence, accident, or mistake, without any fraudulent or deceptive intention.

A patentee may, at his option, have in his reissue a separate patent for each distinct part of the invention comprehended in his original application, by paying the required fee in each case, and complying with the other requirements of the law, as in original applications.

Each division of a reissue constitutes the subject of a separate specification descriptive of the part or parts of the invention claimed in such division; and the drawing may represent only such part or parts. Adress MUNN & CO., 37 Park Row, for full particulars.

Interferences.—When each of two or more persons claims to be first inventor of the same thing, an "interference" is declared between them, and a trial is had before the Commissioner. Nor does the fact that one of the parties has already obtained a patent prevent such an interference; for although the Commissioner has no power to cancel a patent already issued, he may, if he finds that another person was the prior inventor, give him also a patent, and thus place them on an equal footing before the courts and the public.

Caveats.—A Caveat gives a limited but immediate protection, and is particularly useful where the invention is not fully completed, or the model is not ready, or further time is wanted for experiment or study. After a Caveat has been filed, the Patent Office will not issue a patent for the same invention to any other person, without giving notice to the Caveator, who is then allowed three months time to file an application for a patent. A Caveat, to be of any value, should contain a clear and concise description of the invention, so far as it has been completed, illustrated by drawings when the object admits. In order to file a Caveat the inventor needs only to send us a letter containing a sketch of the invention, with a description in his own words. Address MUNN & CO., 37 Park Row, New York.

Additions can be made to Caveats at any time. A Caveat runs one year, and can be renewed on payment of $10 a year for as long a period as desired.

Quick Applications.—When from any reason parties are desirous of applying for Patents or Caveats, in GREAT HASTE, without a moment's loss of time, they have only to write or telegraph us specially to that effect, and we will make special exertions for them. We can prepare and mail the necessary papers at less than an hour's notice, if required.

Foreign Patents.—American inventors should bear in mind that, as a general rule, any invention that is valuable to the patentee in this country is worth equally as much in England and some other foreign countries. Five Patents—American, English, French, Belgian, and Prussian—will secure an inventor exclusive monopoly to his discovery among ONE HUNDRED AND THIRTY MILLIONS of the most intelligent people in the world. The facilities of business and steam communication are such that patents can be obtained abroad by our citizens almost as easily as at home. The majority of all patents taken out by Americans in foreign countries are obtained through the SCIENTIFIC AMERICAN PATENT AGENCY. A circular containing further information and a Synopsis of the Patent Laws of various countries will be furnished on application to Messrs. MUNN & Co.

For instructions concerning Foreign Patents, Reissues, Interferences, Hints on Selling Patents, Rules and Proceedings at the Patent Office, the Patent Laws, etc., see our Instruction Book. Sent free by mail on application. Those who receive more than one copy thereof will oblige by presenting them to their friends.

Address all communications to

MUNN & CO.,
No. 37 Park Row, New York city.

Office in Washington, corner of F and 7th streets.

Patents are granted for Seventeen Years, the following being a schedule of fees:

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

Advertisements.

The value of the SCIENTIFIC AMERICAN *as an advertising medium cannot be over-estimated. Its circulation is ten times greater than that of any similar journal now published. It goes into all the States and Territories, and is read in all the principal libraries and reading rooms of the world. We invite the attention of those who wish to make their business known to the annexed rates. A business man wants something more than to see his advertisement in a printed newspaper. He wants circulation. If it is worth 25 cents per line to advertise in a paper of three thousand circulation, it is worth $2.50 per line to advertise in one of thirty thousand.*

RATES OF ADVERTISING.

Back Page.....$1.00 *a line.*
Inside Page.....75 *cents a line.*

Engravings may head advertisements at the same rate per line, by measurement, as the letter press.

FOR Fine, Smooth Castings, made of A No. 1, Soft and Strong Iron, send your Patterns to LIVINGSTON & CO., Iron Founders, Pittsburgh, Pa.

BACON'S IMPROVED
TRUNK ENGINE,
For Stationary and Hoisting Purposes.
This Engine is New, Simple, and Compact, and is Cheaper than anything in the market. It can be readily used for all purposes where steam power is needed. Send for Price and Descriptive Lists. Manufactured and for sale by BROOKS & BACON,
1* No. 430 West st., New York city.

STATIONARY
STEAM ENGINES
& BOILERS.
MANUFACTURED AS A SPECIALTY, and a superior article, afforded at very low prices by WOODBURY, BOOTH & CO.,
24 4 Rochester, N. Y.

$10 A Day for all. Stencil tool, samples free. Address A. J. FULLAM, Springfield, Vt.
24 4

$20 A Day Cleared—Agents wanted everywhere. Send for circular. HYSON & CO., Pittsburgh, Pa.

THE NEW SYSTEM OF
Life Insurance.
IMPROVEMENTS.

The simplest and best thing ever done in improving Life Insurance was the adoption of the system of **Classifying Lives** by the **American Popular Life Insurance Company.** By this plan the "best risks" are insured in a class by themselves, and inferior risks in other classes, each class being distinct, paying its own losses, and sharing its own surplus; each, as it were, a separate Company, but all under one management.

This classification divides those persons who would be insured by other Companies into at least four distinct classes. The bases of this classification are
INHERITED LONGEVITY,
CONSTITUTION,
HEALTH,
HABITS,
RESIDENCE,
VOCATION,
INTELLIGENCE.

That is to say, that persons of long-lived ancestry, good constitution, health, habits, etc., are classed with those similar to themselves, in these respects, and persons with inferior advantages in other classes, the premiums varying with the classes.

The best class have the advantage of lower premiums, and more rapid and greater increase of the surplus and value of policies than can be afforded by any other system or Company, as by being separately classed, they are relieved of the great burden and expense of paying the numerous losses of the naturally shorter lived, and comparatively weak persons.

The effects of this classification, in individual cases, can easily be determined through correspondence, or by calling at the Company's office, where an examination and full explanation can be had without charge.

As being the only one originated entirely in this country, this is called the AMERICAN SYSTEM OF LIFE INSURANCE, and the
AMERICAN POPULAR LIFE INSURANCE COMPANY,
having taken it as the basis of their business, had in view the perfecting of a plan whose methods of business should be entirely free from the mystifications and inequities under which Life Insurance, on the old or European system, had so long labored, and which, at the same time, should be popular, or simple and easily understood by all.

The peculiar features and the details of its business are fully and plainly set forth in its circular and other publications, which, together with an official report, showing its unparalleled success up to January, 1868, can be obtained at the Company's Office, or will be promptly mailed to any address.

The officers desire it to be fully understood that they hold themselves in readiness to discuss the methods and principles of the Company, before the public, in any manner that may be desired, feeling sure that their greatest publicity will insure its greatest success.

CENTRAL OFFICE,
419 *and* 421 *Broadway,*
Corner Canal st.,
New York.
24 3

CASTINGS—Hardware, Sewing Machine, or other small gray iron castings, of superior quality, at low rates, delivered in New York. Address
24 3* JONES, COXE & CO., Reading, Pa.

M. N. FORNEY, Mechanical Engineer, Executes designs and drawings, and negotiates contracts for the construction of railroad and other machinery, steam engines, boilers, iron bridges, roofs, etc., etc. Orders for engineers' supplies promptly filled.
1* 72 Broadway, (Room 4,) New York.

FABRICATION OF SOAPS.—Prof. H. Dussauce, Chemist, is ready to furnish the most recent European processes to manufacture every kind of lyes, and the following soaps:—Hard, white, and marbled castile, family, rosin, palm and cocoa oils, soft, fancy, transparent, silicated, etc. Plans of Factories, drawings of apparatus, analyses and assays of alkalies, acids, greases, oils, soaps, etc. Address
Prof. H. DUSSAUCE, Chemist,
1* New Lebanon, N. Y.

CARPENTERS AND BUILDERS.—Take Notice.—Great improvements recently made in Talpey's patent hand ripping and scroll-sawing machine. Prices reduced. Call and examine.
24 4 WM. H. HOAG, Manufacturer, 214 Pearl st.

PAGE'S GREAT WATER FLAME Coal, Patented Lime Kiln will burn No. 1 finishing lime with any coal or wood, mixed or separate, in same kiln. Rights for sale by C. D. PAGE, Rochester, N. Y.
24 26

CAMPAIGN PINS—Unique in Design, elegantly finished, silver plated and enameled in the national colors, with a perfect likeness of the Presidential candidates. Sample, with wholesale price, sent upon receipt of 25c. E. N. FOOTE, Manufacturer,
24 tf New England Village, Mass.

Steel Letter Cutting
By H. W. GORDON, Lynn, Mass.
23 4*

STENCIL TOOLS And Stock, Cheapest and Best. M. J. METCALF & SON,
23 4 101 Union st., Boston, Mass.

DODWORTH, ALLEN & FISCHER,
MUSICAL INSTRUMENTS
Of all kinds Made to Order. Send for price list.
23 3 6 Astor Place, New York.

Pat'd Wood Benders,
JOHN C. MORRIS,
No. 122 East 2d street.....Cincinnati, Ohio.
23 4

PATENT SHINGLE, STAVE, AND Barrel Machinery, Comprising Shingle Mills, Heading Mills, Stave Cutters, Stave Jointers, Shingle and Heading Jointers, Heading Rounders and Planers, Equalizing and Cut-off Saws. Send for Illustrated List.
FULLER & FORD,
23 tf 282 and 284 Madison street, Chicago, Ill.

For Sale.
A HEAVY RAIL STRAIGHTENER, (new). Will Straighten a 65-lb Rail. Price $500.
ALLISON & BANNAN,
23 2 Franklin Iron Works, Port Carbon, Pa.

THE NEW $1 WATCH. THE MAGnetic Pocket Time Keeper and Compass, handsome case, glass crystal, white dial, steel and metal works, watch size, good order. Will denote correct time. Warranted for two years. Satisfaction guaranteed. Sent by mail for $1; 3 for $2; or by express, C.O.D., on receipt of order. Address HUNTER & CO., Hinsdale, N. H.
23 3

WATER POWER—Cheap and Reliable—at Marseilles, Illinois, to Lease, in any quantity, and Lots for Manufacturing or Dwelling purposes, for sale at low prices. Situated on Canal and Railroad, 70 miles from Chicago. This is the Largest and Best Water Power in the West. Address Marseilles Land and Water-power Co., Marseilles, Ill.
23 13

KEY CHECKS And Key-Check Dies. M. J. METCALF & SON,
23 4 101 Union st., Boston, Mass.

Sheet and Roll Brass,
BRASS AND COPPER WIRE,
German Silver, etc.,
Manufactured by the
THOMAS MANUFACTURING CO.,
Thomaston, Conn.
☞ Special attention to particular sizes and widths for Type Founders, Machinists, etc. 23 26

WATCHES, AND ROSKOPF'S Patented People's Watch, cased in Swedish Silver. The improved Aluminium Bronze is a metal differing entirely from any ever offered to the public. Its qualities and resemblance to Gold are such that even judges have been deceived. It has seriously occupied the attention of scientific men, and has not only called forth the eulogiums of the press in consequence of its peculiar properties, but has also obtained a Gold Medal at the Paris Exposition.

The movements are well finished, perfectly regulated, and as all these goods are manufactured in my own factory, I am enabled to warrant them as excellent timekeepers. Price from $16 to $22.

Further details will be found in my pamphlet, which will be sent, postpaid, on demand.

A full assortment of chains. Also, Aluminium Bronze Cases for Waltham Watches. Goods sent by express, C. O. D., with charges. Address
JULES D. HUGUENIN VUILLEMIN,
23 tf No. 44 Nassau st., New York.

WANTED---Agents.
$75 to $200 per Month, Everywhere, male and female, to introduce the GENUINE IMPROVED COMMON SENSE FAMILY SEWING MACHINE. This machine will stitch, hem, fell, tuck, quilt, cord, bind, braid, and embroider in a most superior manner. Price only $18. Fully warranted for 5 years. We will pay $1,000 for any machine that will sew a stronger, more beautiful, or more elastic seam than ours. It makes the "Elastic Lock Stitch." Every second stitch can be cut, and still the cloth cannot be pulled apart without tearing it. We pay agents from $75 to $200 per month and expenses, or a commission from which twice that amount can be made. Address SECOMB & CO., Pittsburgh, Pa., or Boston, Mass.

CAUTION.—Do not be imposed upon by other parties palming off worthless cast-iron machines, under the same name or otherwise. Ours is the only genuine and really practical cheap machine manufactured. 23 4*

A. J. WILKINSON & CO.'S TOOL STORE.—Headquarters for all the Standard Qualities and New Improvements in Tools. Full illustrated catalogues sent by mail on the receipt of 20 cts.
A. J. WILKINSON & CO.,
21 4* 2 Washington st., Boston.

WANTED—AGENTS.—$200 per month the year round, or a certainty of $500 to $1000 per month to those having a little capital. We guaranty the above monthly salary to good active agents at their own homes. Every agent, farmer, gardner, planter, and fruit grower, North and South, should send at once for particulars. Please call on or address
21 4 J. AHEARN & CO., 68 Second st., Baltimore, Md.

Machinery for Sale.
NEW AND SECOND-HAND MILLING or Slabbing Machines, of best construction, Edging Machines, Screw-making Machines, Drill Presses (4 spindles), planers for iron, Engine Lathes, with and without screw cutting, etc., Bench Vises (English & Parker's make), Gun-barrel Rifling Machines, Gun-barrel Turning Machines, Gun-barrel Boring Machines, Pistol-barrel Rifling Machines, Pistol-barrel Boring Machines, Clamp Milling Machines, Gun Stocking Machinery of best quality, assortment of Hangers, Pulleys, and Shafting, Belting, Anvils, assortment of Iron and Steel, lot of Bolts, assorted sizes, 150 Glass Hanging Lamps for Kerosene Oil, for Factory use, 1 Dbl. Lamp Chimneys, etc., etc. Address
WHITNEY ARMS CO.,
Whitneyville, near New Haven, Conn.
may 21, 1868 23 8

PLANER and Matcher for $350, a good new Machine. S. C. HILLS, 12 Platt st., New York.
23 6eow*

VERY IMPORTANT.
THE WHOLE FOUNDATION OF THE OLD VARIETY MOLDING MACHINE, built at New York, is the GEAR PATENT, extended Sept. 20, 1867. The C. M. and P. Machine Company own ONLY A VERY LITTLE OF THE PATENT, outside of the State of New York. The owners, and Attorneys for owners, of the GEAR PATENT, and *sole* manufacturers of the best improved machines made for planing and molding straight and irregular forms in wood, perfectly safe to operate with improved Feed Table, and improved adjustable collars for combination cutters, saveing 100 per cent (for all the rest of the United States) are
A. S. GEAR, JOHN GEAR & CO.,
New Haven, Conn., and Concord, N. H.
☞ *We Warrant our Machines, and Caution the Public to Buy Machines of Lawful Owners* ONLY.
☞ We are Sole Manufacturers of the only **practicable** Guards invented. They can be attached to any Machine.
☞ Send for a Descriptive Pamphlet. 24 eow tf

IMPORTANT.—MOST VALUABLE MAchine for planing, irregular and straight work, in wood, is the Variety Molding and Planing Machine, for all branches of wood working. Our improved guards make it safe to operate. Combination collars for cutters save one hundred per cent. For planing, molding, and cutting irregular forms, the machine is unsurpassed.

We hear there are manufacturers infringing on our eight patents on this machine. We caution the public against purchasing such.

All communications must be addressed to COMBINATION MOLDING AND PLANING MACHINE CO., P. O. Box 3,250, New York city.

Our machines we warrant. Send for descriptive pamphlet. Agents solicited. 20 tf eow

HYDRAULIC PRESSES, STATIONary and Portable for Pressing Powder, Fish, Oil Books, Tallow, Linseed, etc. Send for a circular to
2 eow13* E. LYON, 470 Grand street, New York.

MACHINISTS send for Price List of Tools. GOODNOW & WIGHTMAN, 23 Cornhill, Boston.
18 eow

Sault's Patent
FRICTIONLESS Locomotive Valves, easily applied; requires no changes.
12 13t* M. & T. SAULT COMPANY, New Haven, Conn.

PLANES.—BAILEY'S ADJUSTABLE WOOD OR IRON PLANE A New and Superior Article. Descriptive Circulars sent on application. Wilkinson's Polished Bench Planes excel all others in quality and finish. Iron Circular Planes, with Spring Steel Face, adjustable to any concave or convex surface at A. J. WILKINSON & CO.'S,
23 3eow 2 Washington st., Boston.

L. D. FAY'S IMPROVED WOOD-TURNING LATHES for every variety of work. Wardwell's Patent Saw Bench, etc. Machinists' Tools and Lathe Chucks. Manufactory, Worcester, Mass. 23 eow tf

MANUFACTURERS—And others using Steam Engines, can, by applying the INDICATOR, ascertain the condition of their Engines; the power required to do their work, or any portion thereof; the economy of fuel expended, when compared with power developed. The undersigned makes a specialty of this branch of engineering, and will wait on any party who desires his services. Instruments furnished and instructions given. F. W. BACON,
18 tfeow Consulting Engineer, 84 John st., N. Y.

A BOOK THAT EVERYBODY SHOULD HAVE.
WELLS' EVERY MAN HIS OWN LAWYER, AND BUSINESS FORM BOOK,
Is a Complete and Reliable Guide in all matters of Law and Business Transactions for EVERY STATE IN THE UNION.
THE ENTIRE LEADING PRESS OF THE COUNTRY unqualifiedly endorse the work. We make a few short extracts from the press:
"An elegant adviser always at hand to instruct the reader how to proceed in suits and business transactions of every and all kinds; as a form book to enable the least learned to draw up deeds, mortgages, agreements leases, orders, wills, etc.; as a guide with regard to the laws of the various States concerning exemptions, liens, limitation of actions, collection of debts, usury, and so on, this volume is certainly invaluable to men of business, and it is not surprising that a hundred thousand copies have so soon found their way into the homes and country houses of the multitude. In addition, the work contains a full digest of the action of the Government relative to reconstruction and the freedmen, the General Bankrupt Law, the Patent Laws, Pension Laws, the Homestead Laws, the Internal Revenue Laws, etc. The publisher has determined to make this work complete, and, to our thinking, he has succeeded. No business man or woman can with safety be without it."—New York Times.
"This work is one of the most valuable issues of the press of this country. It contains so much that every man in business should know, but which none have the time to acquire from voluminous works, that it is truly indispensable."—New York Dispatch.
"Such a useful book can not be too highly commended. A more comprehensive digest could not be desired."—New York Weekly Tribune.
"There should be a copy of it in every family."—New York Weekly.
"The most implicit confidence can be placed upon the work as authority on all the subjects of which it treats."—Philadelphia Age.
"You can purchase in this book what may be worth hundreds of dollars to you."—St. Louis Dispatch.
"It contains just the kind of information every business man stands most in need of."—Sunday Mercury.
"Every man no matter what his business may be, should have a copy."—Pittsburgh Dispatch.
"There is no better book of reference."—Parsonological Journal.
"The book is prepared to meet all the ordinary contingencies of business life, and it meets them clearly distinctly and well."—Round Table.
"It contains a vast amount of just such matter as every one ought to be acquainted with in the prosecution of all ordinary business."—N. Y. Christian Advocate.
"It is the best business guide ever published."—De Bow Journal, St. Louis.
"Every one should have a copy."—N. Y. Eve. Post.
"It is invaluable."—Cincinnati Enquirer.
"Indispensable to every household."—Cincinnati Commercial.
"This work is worthy of the popularity it has acquired as a convenient and reliable manual."—N. Y. Herald.
The work is published 12 mo. size, 650 pages. Price in full leather binding $2 50, in half library $2 00. Sent postpaid on receipt of price.
Agents wanted everywhere.—Address
B. W HITCHCOCK, Publisher
98 Spring street, N. Y.

CHARLES A. SEELY, CONSULTING and Analytical Chemist, No. 26 Pine street, New York. Assays and Analyses of all kinds. Advice, Instruction, reports, etc., on the useful arts. 1 tf

JUST PUBLISHED—THE INVENTOR'S and MECHANIC'S GUIDE.—A new book upon Mechanics, Patents, and New Inventions. Containing the U. S. Patent Laws, Rules and Directions for doing business at the Patent Office; 132 diagrams of the best mechanical movements, with descriptions; the Condensing Steam Engine, with engraving and description; How to Invent; How to Obtain Patents; Hints upon the Value of Patents; How to sell Patents; Forms for Assignments; Information upon the Rights of Inventors, Assignees and Joint Owners; Instructions as to Interferences, Reissues Extensions, Caveats, together with a great variety of useful information in regard to patents, new inventions and scientific subjects, with scientific tables, and many illustrations. 168 pages. This is a most valuable work. Price only 25 cents. Address MUNN & CO. 37 Park Row, N. Y.

SETS, VOLUMES AND NUMBERS. Entire sets, volumes and numbers of SCIENTIFIC AMERICAN (Old and New Series) can be supplied by addressing A. B. C., Box No. 773, care of MUNN & CO., New York.

CAN I OBTAIN A PATENT?—For Advice and instructions address MUNN & CO., 37 Park Row New York for TWENTY YEARS Attorneys for American and Foreign Patents. Caveats and Patents quickly prepared. The SCIENTIFIC AMERICAN $3 a year. 10,000 Patent cases have been prepared by M. & Co.

Philadelphia Advertisements.

☞ Philadelphia Advertising Patrons, who prefer it, can have their orders forwarded through P. V. Carpenter resident Agent, 313 North Sixth street.

POWER LOOMS. Improved Drop Box, Spooling, Winding, Beaming Dyeing, and Sizing Machines. Self-Acting Wool Scouring Machines, Hydra Extractors. Also, Shafting, Pulleys, and Self-Oiling Adjustable Hangers, manuf'd by THOS WOOD, 2100 Wood st., Phil'a, Pa.
21 13

FRICK'S Newspaper, Sheet Music, and Letter File, for book or usual form. 614 N. 3d st., Phila
21 4

E. KETTERLINUS, Philadelphia,
Lithographed, Gilt and Embossed
Manufacturers' Labels & Tickets
21 13

CAMDEN TOOL AND TUBE WORKS CO., Camden, N. J., Manufacture Wrought Iron Pipe, and all the most Improved Tools for Screwing, Cutting, and Fitting Pipe. 19 13*

ESSAYS for Young Men on the Errors and Abuses incident to Youth and Early Manhood, with the humane view of treatment and cure, sent by mail free of charge. Adaress Howard Association, box P, Phila. Pa.
18 13

Morris, Wheeler & Co.,
1608 Market st., Philadelphia, Manufacturers & Dealers in
IRON, STEEL, AND NAILS,
Boiler and Plate Iron, Rivets, etc.
New York Office, 24 Cliff st. Works at Pottstown, Pa. 17 13

Banks, Dinmore & Co.,
Manufacturers of Standard Scales of all Varieties, 9th st., near Coates, Philadelphia. 17 13

SLIDE LATHES, Iron Planers, Upright Drills, Belt Cutters, Compound Planers, Universal Chucks, Gear Cutters, etc., at reduced prices. Address
13 13 CHAS. H. SMITH, 125 North 3d st., Philadelphia

ALBRECHT, RIEKES & SCHMIDT.

MANUFACTURERS OF 1ST-CLASS PIANO FORTES
No. 610 Arch street,
13 13 Philadelphia, Pa.

MERRICK & SONS,
Southwark Foundery
PHILADELPHIA, PA.,
Sole Manufacturers, in Philadelphia, of William Wright's Patent
VARIABLE CUT-OFF STEAM ENGINE,
Regulated by the Governor. Sole Manufacturers in the United States of Weston's Patent
Self-Centering Centrifugal Sugar-Draining Machine.
Bartol's Patent
WROUGHT IRON RETORT LIDS.
Brinckmann's Patent
STEAM HAMMERS,
without valves. Address
18 eow tf] MERRICK & SONS,
430 Washington Ave., Philadelphia, Pa.

FIRE-PROOF CONSTRUCTION.—GILbert's Corrugated "Iron Ceiling," for fire-proof buildings. Office No. 439 Walnut street, Philadelphia. Wrought Iron Beams of all sizes. All kinds of Corrugated Iron. Fire-proof Buildings constructed.
14 13 JOS. GILBERT, Superintendent.

Bridesburg Manf'g Co.,
Office No. 65 North Front Street,
PHILADELPHIA, PA.,
Manufacture all kinds of Cotton and Woolen Machinery including their new
Self-Acting Mules and Looms.
Of the most approved style. Plans drawn and estimates furnished for factories of any size. Shafting and mill gearing made to order. 20 tf

DRYING MACHINES.—For Print Works, Bleacheries, and Dyeing Establishments. Also, for drying Warps and finishing Cotton Cloths. Cylinders made of Tinned Iron or Copper. Cotton Cans made of one sheet of Tinned Iron with wrought iron rings and stamped bottoms. H. W. BUTTERWORTH,
22 6eow 29 and 31 Haydock st., Philadelphia, Pa.

IMPORTANT to ENGINEERS. Improved Indicator of low and high water, and high steam in boilers. Patented 1866. SPRINGER, HESS & CO.,
18 6eow No. 150 North 4th st., Philadelphia, Pa.

ESTEY'S
COTTAGE ORGANS
Have the finest tone, more power, and it takes less money to buy them, than any other instrument in the market. Great inducements offered to Sundayschools and churches. A liberal discount made to Clergymen. Sold by
E. M. BRUCE,
13 North 7th st., Philadelphia.
Send for Price List. 20 6eow

FOR IRON AND WOOD-WORKING Machinery, Steam Engines, Boilers, and Supplies, address HUTCHINSON & LAURENCE, 9 Dey st., N. Y.
23 4

AGENTS Wanted to sell the best money-making article out. Sample, with prices, sent by mail for 30c. Address Cascade Co., Springfield, Vt.
21 tf

PORTABLE FOOT LATHES with Slide Rest and Fittings. Acknowledged Best and Cheapest. Address S. K. BALDWIN, Laconia, N. H. 18 9*eow

FRENCH BURR MILLSTONES, BOLTING CLOTHS, Of the very best qualities imported, Supplied Cheaper than any other house in the country by GEO. TALLCOT,
14 13* 96 Liberty street, New York.

PLATINUM. H. M. Raynor, 743 Broadway, N. Y
23 3*eow

CITY SUBSCRIBERS.—The SCIENTIFIC AMERICAN will be delivered in every part of the city at $4 a year. Single copies for sale at all the News Stands in this city, Brooklyn, Jersey City, and Williamsburg, and by most of the News Dealers in the United States.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgment of their funds.

Advertisements.

A limited number of advertisements will be admitted on this page at the rate of $1 per line. Engravings may head advertisements at the same rate per line, by measurement, as the letter press.

PATTERN LETTERS to put on Patterns for Castings, etc. KNIGHT BROS., Seneca Falls, N.Y. 24 os 25*

THE NEW GAS HEATER.—State Rights for Sale. M. GERMANN, 277 Walnut st., Cincinnati, O. 24 os1*

FOR SALE—A Valuable Patent. Inquire of E. OGILVIE, 28 Bowery, New York. 23 1*os

J. F. WERNER, MODEL MAKER and Machinist, Removed to corner Center and Franklin sts. Particular attention will be given to Working Models and Small Machinery. 24 10s*

STOREKEEPERS, LAWYERS, POSTmasters, Clergymen, Physicians, Expressmen, Booksellers, Telegraph Operators, are informed that they can make, without any interference with their regular avocations, from twenty to fifty dollars a week in any village, town, or city in the United States, by addressing JAY COOKE STURDIVANT, Secretary Public Life Insurance Company, No. 123 South Fifth st., Philadelphia. 24 os1*

A BARGAIN.—One second-hand 25-horse "Wood & Mann" Portable Engine, good as new. Also, 5 and 10-horse powers, stationary engines, saw mills, iron and wood-working machinery. os 1* HAMPSON & COPELAND, 99 Liberty st., N. Y.

MILLER'S ADJUSTABLE INDICATOR for rounding saws, manufactured and sold by HENRY SEYMOUR & CO., 52 Beekman st., New York. Sent to any address. Price $4 50. A liberal discount to the trade. os 1*

EXCELSIOR
Drill Chuck.
LATEST & BEST.
The most Powerful and Durable. Especially adapted to screw making and Machinery.
Call or send for a Circular.
EXCELSIOR CHUCK M'F'G CO., Office 61 Reade st., os 4* near Broadway, New York.

PRANG'S AMERICAN CHROMOS for sale at all respectable Art Stores. Catalogues mailed FREE by L. PRANG & CO., Boston. 23 26 os

Pressure Blowers

OF ALL SIZES, for purposes where a blast is required. For particulars and circulars, address B. F. STURTEVANT, No. 72 Sudbury st., Boston, Mass. 17 os11*

AGENTS WANTED.—
People in want of, and Agents who are selling all kinds of SEWING MACHINES, are requested to address me (with stamp) for greatly reduced prices and terms. 21 4os J. K. PEARSONS, box 4, Charlestown, Mass.

WIRE ROPE.
Manufactured by
JOHN A. ROEBLING
Trenton, N. J.
FOR Inclined Planes, Standing Ship Rigging, Bridges, Ferries, Stays or Guys on Derricks and Cranes, Tiller Ropes, Sash Cords of Copper and Iron, Lightning Conductors of Copper. Special attention given to hoisting rope of all kinds for Mines and Elevators. Apply for circular, giving price and other information. 14 9*os

Ready Roofing

READY ROOFING.—The first customer in each place can buy 1000 feet of Roofing at half price—$25. Samples and circulars sent by mail. Ready Roofing Co., 81 Maiden Lane, New York. 24 tf os

"BENEDICT'S TIME," for this Month. Timetables of all Railroad and Steamboat lines from New York, with City Map, 25c., sent by mail.
BENEDICT BROS., Jewelers, 171 Broadway.
BENEDICT BROS., up town, 691 Broadway.
BENEDICT BROS., Brooklyn, 334 Fulton st. 1 tf

LATHE CHUCKS—HORTON'S PATENT—from 4 to 28 inches. Also for car wheels. Address, E. HORTON & SON, Windsor Locks, Conn. 18 tf

BUERK'S WATCHMAN'S TIME DETECTOR.—Important for all large Corporations and Manufacturing concerns—capable of controlling with the utmost accuracy the motion of a watchman or patrolman, as the same reaches different stations of his beat. Send for a Circular. J. E. BUERK, P. O. Box 1,057, Boston, Mass.
N. B.—This detector is covered by two U. S. patents. Parties using or selling these instruments without authority from me will be dealt with according to law. 16 12*

THE SICCOHAST—
Is acknowledged to be the best **Paint Dryer** known. Among my authorities for this assertion I select Mr. J. H. Peake, Master Painter at the Washington Navy Yard. Mr. J. B. Brown, Master Painter at the Brooklyn Navy Yard. Messrs. Barney & Styles, painters, 40 Hudson st., New York. Mr. W. J. McPherson, Mr. John S. Martin, painters, Boston, Mass. Prepared and sold by ASAHEL WHEELER, Boston. 23 4*

R. A. VERVALEN'S Power Press Brick Machine, making 9-10ths of all the Brick used in the cities of New York, Brooklyn, Jersey City, Hoboken, and the surrounding sections. Made by R. A. VERVALEN & CO., Haverstraw, Rockland county, N. Y. 22 10*

WOOD-WORKING MACHINERY, The SUBSCRIBER is the New York Agent for all the Manufacturers, and sells at their prices. S. C. HILLS, 12 Platt st. 3 tf e

EMPLOYMENT.—$15 to $30 a day guaranteed. Male or Female Agents wanted in every town—descriptive circulars free. Address 15 15—N.] JAMES C. RAND & CO., Biddeford, Me.

POWER PUNCHES AND SHEARS, Straightening Machines. Vertical Drills, etc. Address GREENLEAF & CO., Indianapolis Ind. 20 tf

HUB MACHINERY.—Address KETTENRING & STRONG, Defiance, Ohio. 22 10*os

PHOENIX IRON WORKS—
Established 1831.
GEO. S. LINCOLN & CO.,
Iron Founders and Manufacturers of Machinists and Gun Tools, 54 to 60 Arch street, Hartford, Conn. Samples may be seen in our Warerooms. 22 tf

SPICE CAN AND BLACKING BOX Riveting Machines (Improved), Foot or Power. Send for circulars and sample. 15 13] W. PAINTER & CO., 45 Holliday st., Baltimore

STIMPSON'S SCIENTIFIC PEN.

One Forward and two Backward Arches, insuring great strength, well balanced elasticity, evenness of point, and smoothness of execution. Sold by all Stationers. One gross in twelve contains a Scientific Gold Pen. One doz. Steel Pens (assorted points) and Patent Ink-retaining Penholder mailed on receipt of 50c. A. S. BARNES & CO., 111 and 113 William st., New York. 23 4os

IRON PLANERS, ENGINE LATHES, Drills, and other Machinists' Tools, of Superior Quality, on hand and finishing. For Sale Low. For Description and Price, address NEW HAVEN MANUFACTURING CO., New Haven. 15 12os* tf

GREAT ECONOMY IN
WATER POWER.

LEFFEL'S DOUBLE TURBINE WATER WHEEL.—Best Wheel in Existence.—Manufactured by JAS. LEFFEL & CO., at Springfield, Ohio, and New Haven, Conn.
New Illustrated Pamphlet for 1868 sent free on application. 23 ostf

WHEATON'S OINTMENT cures the Itch
WHEATON'S OINTMENT will cure Salt Rheum.
WHEATON'S OINTMENT cures Old Sores.
WHEATON'S OINTMENT cures all diseases of the Skin.
Price 50 cents;—by mail 60 cents. All Druggists sell it.
WEEKS & POTTER, Boston, Proprietors. 2 tf os

FREE. Our New Catalogue of Improved STENCIL DIES. More than $200 A MONTH is being made with them S. M. SPENCER & CO., Brattleboro, Vt. 6ostf

PATENT PLYER SAW SET.

FOR Carpenters, Manufacturers, etc. Superior to any other. Four sizes, all steel. Sample price, No. 1, (carpenter's size,) $1 75. Liberal reduction to the trade and agents. Address NORTON, LIBBY & CO. Factory Poughkeepsie, N. Y. 23 4os

EMERSON'S PATENT MOVABLE TOOTHED CIRCULAR SAWS
SUPERIOR TO ALL OTHERS.
FOR DESCRIPTIVE PAMPHLET ADDRESS
THE AMERICAN SAW CO. N.Y.

EMERSON'S PATENT PERFORATED CIRCULAR & LONG SAWS
REQUIRE NO GUMMING
FOR DESCRIPTIVE PAMPHLET ADDRESS
AMERICAN SAW CO. N.Y.

Factory, Trenton, N. J. Office, No. 2, Jacob st., N. Y.

CIRCULAR SAWS.
N. W. SPAULDING & BROTHERS,
41 South Canal street,
CHICAGO, ILL.

Manufacturers of Spaulding's Patent Adjustable-Tooth Circular Saws, adapted to sawing all kinds of timber. These teeth have been in successful use for the last eight years. They save saws, power, and time, making the safest, most durable, and economical saw in use.
☞ Particular attention paid to straightening and repairing large saws. All saws sold and work done warranted.
Send for descriptive pamphlet and price list. 22 4oseow

THE MASS. INSTITUTE OF TECHNOLOGY offers a thorough and practical general education, founded upon the Mathematical, Physical, and Natural Sciences, English and other Modern Languages, and Mental and Political Science; also, a full course of Studies and Practical Exercise for students preparing for the professions of the Civil, Mechanical, and Mining Engineer, Chemist, Metallurgist, and Architect.
The course extends through four years, the studies of the first and second being common to all, those of the third and fourth selected to suit the profession in view.
Minimum age of admission, sixteen. Entrance examinations are held July 13th and Sept. 28th. For fees and other particulars address "Prof. WILLIAM P. ATKINSON, Sec. of Faculty Mass. Inst. of Technology, Boston." 22 3oseow WILLIAM B. ROGERS, President.

$10 TO $20 A DAY GUARANTEED.
GOOD Agents wanted to introduce our new **Star Shuttle Sewing Machine**—Stitch alike on both sides. The only first-class, low-priced machine in the market. We will consign Machines to responsible parties, and employ Energetic Agents on a Salary. Full particulars and sample work furnished on application. Address W. G. WILSON & CO., Cleveland, Ohio, Boston, Mass., or St. Louis, Mo. 22 13os

Reynolds'
TURBINE
WATER WHEELS
And all kinds of
MILL MACHINERY.

Send for Illustrated Pamphlet.
GEORGE TALLCOT,
96 Liberty st., New York.
14 13* os

WANTED—Ladies and Gentlemen everywhere, in a business that will pay $5 to $20 per day; no book, patent right, or medical humbug, but a standard article of merit, wanted by everybody, and sold at one third the usual price, with 200 per cent profit to our agents. Samples and circulars sent by mail for 35 cents. 12 tf] WHITNEY & SON, 6 Tremont st., Boston, Mass.

RICHARDSON, MERIAM & CO.,
Manufacturers of the latest improved Patent Daniels and Woodworth Planing Machines, Matching, Sash and Molding, Tenoning, Mortising, Boring, Shaping, Vertical and Circular Re-sawing Machines, saw Mills, Saw Arbors, Scroll Saws, Railway, Cut-off, and Rip Saw Machines, Spoke and Wood Turning Lathes, and various other kinds of Wood-working machinery. Catalogues and price lists sent on application. Manufactory, Worcester, Mass. Warehouse, 107 Liberty st., New York. 21 tf

PORTABLE STEAM ENGINES, COMbining the maximum of efficiency, durability, and economy with the minimum of weight and price. They are widely and favorably known, more than 600 being in use. All warranted satisfactory or no sale. Descriptive circulars sent on application. Address J. C. HOADLEY & CO., Lawrence, Mass. tf

OIL! OIL!! OIL!!!
FIRST PREMIUM.....PARIS, 1867
Grand Silver Medal and Diploma!
WORLD'S FAIR—London, 1862.
TWO PRIZE MEDALS AWARDED
PEASE'S IMPROVED OILS!
Engine, Signal, Lard, and Premium Petroleum is the Best Made for
Railroads, Steamers, and for Machinery and Burning.
F. S. PEASE, Oil Manufacturer,
Nos. 61 and 63 Main street, Buffalo, N. Y.
N B.—Reliable orders filled for any part of the world. 7 tf

MODELS, PATTERNS, EXPERIMENTAL, and other Machinery. Models for the Patent Office, built to order by HOSKE MACHINE CO., Nos. 536, 550, and 552 Water street, near Jefferson. Refer to SCIENTIFIC AMERICAN office. 14 tf

YOU CAN SOLDER your own tin ware without a soldering iron by buying one bottle of Wilson's Prepared Solder. Samples sent on receipt of 25 cents, with price list. Agents wanted everywhere. Direct to WILSON & CO., 19 Lindall st., Boston. 12 tf-D

TODD & RAFFERTY, Manufacturers and DEALERS IN MACHINERY.
Works, Paterson, N. J.; Warerooms, 4 Dey st., N. Y., Boilers, Steam Pumps, Machinists' Tools. Also, Flax, Hemp, Rope & Oakum Machinery; Snow's & Judson's Governors; Wright's Patent Variable Cut-off & other Engines. 9 tf

WATER-WHEEL GOVERNORS,—
First-Class Line Shafting and Pulleys. Address GREENLEAF & CO., Indianapolis, Ind. 19 tf

RAILROAD, STEAMSHIP, MANUFACturers, and Engineer's Supplies, of all kinds, at 1 24* M. T. DAVIDSON & CO.'S, 84 John st., N. Y

WHEELER & WILSON, 625 BROADway, N. Y.—Lock-stitch Sewing Machine and Buttonhole do. 2 tf*

IRON & WOOD WORKING MACHINERY
TURBINE WATER WHEELS.
LUCIUS W. POND,
98 Liberty st., N. Y., and Worcester, Mass. 23 tf

FARMER'S THERMO-ELECTRIC BATTERY, W. H. Remington, Manufacturer and Agent. Manufactory at Cohasset, Mass. Office and salesroom, No. 109 Court street, Boston, Mass.
This Battery does away entirely with acids, quicksilver, or liquids of any kind, the electrical current being generated by the action of heat, a simple gas burner being all that is required to put this battery into action. It is clean, constant, and requires no care, performing the work of any acid battery. 23 tf

FOR STEAM ENGINES, BOILERS, SAW Mills, Cotton Gins, address the ALBERTSON AND DOUGLASS MACHINE CO., New London, Conn. 15 tf

WANTED—Agents to sell by Sample a Combined Square, Level, and Bevel. Great inducements offered. County Rights for sale on most liberal terms. For particulars address W. S. BATCHELDER & CO., 21 4 Pittsburgh, Pa.

WOODWORTH PLANERS A SPECIALTY—From new patterns of the most approved style and workmanship. Wood-working Machinery generally. Nos. 24 and 26 Central, corner Union street, Worcester, Mass. 16 18* WITHERBY, RUGG & RICHARDSON.

Zur Beachtung für deutsche Erfinder.

Nach dem neuen Patent-Gesetze der Vereinigten Staaten, können Deutsche, sowie Bürger aller Länder, mit einer einzigen Ausnahme, Patente zu denselben Bedingungen erlangen, wie Bürger der Ver. Staaten.

Erkundigungen über die, zur Erlangung von Patenten nöthigen Schritte, können in deutscher Sprache schriftlich an uns gerichtet werden und Erfinder, welche persönlich nach unserer Office kommen werden, von Deutschen prompt bedient werden.

Die Patentgesetze der Vereinigten Staaten,

nebst den Regeln und der Geschäftsordnung der Patentoffice, und Anleitungen für die Erfinder um sich Patente zu sichern, sind in Buch-Format von uns in deutscher Sprache herausgegeben, und werden gratis an alle versandt, welche darum mündlich oder schriftlich einkommen.

Man adressire

MUNN & CO.
37 Park Row, New York

Philadelphia Advertisements.

☞ Philadelphia Advertising Patrons, who prefer it, can have their orders forwarded through T. V. Carpenter resident Agent, 313 North Sixth street.

THE
HARRISON BOILER
HAS ABSOLUTE SAFETY!
HAS GREAT ECONOMY IN FUEL
HAS DURABILITY AND FACILITY OF REPAIR.
Hundreds of these boilers have now been in use for years, giving perfect satisfaction. For descriptive circular and price apply to
JOHN A. COLEMAN, Agent, 53 Kilby street, Boston, Mass.
J. B. HYDE, Agent, Office No. 9, at 119 Broadway, New York, or to
THE HARRISON BOILER WORKS, 22 tf] Gray's Ferry Road, Philadelphia, Pa.

WICKERSHAM'S
American Oil Feeder.
See Scientific American, Vol. XVII., No. 21.
"Using, in six months, 2¾ os. oil on 2¾ in. journal; perfectly reliable."—Wm. Sellers & Co.
"Best self-oiler we are cognizant of."—Neafie & Levy
"There is no need of any further improvement in that line."—Jacob Haehnlen.
"More economical and reliable than any mode I ever used."—Henry Disston.
In use at Fairmount Water Works, Philadelphia, Public Ledger, Clark Thread Co., Newark, N. J., and by many others.
Agents Wanted. Circulars sent.
J. B. BICKERSHAM & SON, General Agents, 24 os8eow 143 South Front st., Philadelphia.

JUST ISSUED—The Carpenter, Joiner, and Elements of Hand Railing. by Robert Riddell. Complete in large vol., 32 plates, price $7. Published by CLAXTON & CO., 821 Market st., Philadelphia. 24 os 2*

PALMER'S
Patent ARTIFICIAL LIMBS.
Ten Thousand in Use.
B. Frank Palmer, LL.D., Surgeon, Artist, Inventor, and Sole Proprietor. Offices 1609 Chestnut st., Philadelphia; 678 Broadway, N.Y.; 81 Green st., Boston. Illustrated Books sent free to applicants 21 4os

ELECTRIC TOY!—
State and County Rights for sale. Toys in any quantity. Send for Circular. FUNSTON & BLACKSTONE, 21 4os 912 Market st., Philadelphia.

STEREOPTICONS
AND
Magic Lanterns
Of every description, with the Oxy-Hydrogen Magnesium, Calcium, and Oil Lights. A Priced and Illustrated Catalogue of the above, and over 5000 views for the same, manufactured and for sale by me, will be sent on application to WILLIAM Y. McALLISTER, 21 5os 728 Chestnut street, Philadelphia, Pa.

THE PHRENOLOGICAL JOURNAL
FOR JUNE, ready now, serves up the following bill of mental fare:—The late Geo. Hall, of Brooklyn, Phineas Staunton, Gov. Isaac Murphy, J. G. Holland, King Theodore, Thos. D'Arcy Magee, with portraits and sketches; Dreaming and Insanity, the Secret of Success, Young Men, Writing for the Press, Abyssinia and its People, etc. A new volume begins with the next number. $3 a year or 30 cents a number. Published by S. R. WELLS, 22 2 No. 389 Broadway, New York.

1868.
Scientific American.
THE
BEST PAPER IN THE WORLD.
Published for Nearly
A QUARTER OF A CENTURY.

This **Splendid Newspaper**, greatly enlarged and improved, is one of the most reliable, useful, and interesting journals ever published. Every number is **beautifully printed and elegantly illustrated** with several **Original Engravings**, representing New Inventions, Novelties in Mechanics, Agriculture, Chemistry, Photography, Manufactures, Engineering, Science and Art.

Farmers, Mechanics, Inventors, Engineers, Chemists, Manufacturers, people in every profession of life, will find the **SCIENTIFIC AMERICAN** to be of great value in their respective callings. Its counsels and suggestions will save them Hundreds of Dollars annually, besides affording them a continual source of knowledge, the value of which is beyond pecuniary estimate. All patents granted, with the claims, published weekly.

Every Public or Private library should have the work bound and preserved for reference.

The yearly numbers of the **SCIENTIFIC AMERICAN** make a splendid volume of nearly one thousand quarto pages, equivalent to nearly **four thousand ordinary book pages.** A New Volume commences January 1, 1868. Published Weekly. **Terms:** One Year, $3; Half-Year, $1 50; Clubs of Ten Copies for One Year, $25; Specimen Copies sent gratis.

Address
MUNN & CO.,
37 Park Row, New York.

☞ The Publishers of the **Scientific American**, in connection with the publication of the paper, have acted as **Solicitors of Patents** for **twenty-two years. Thirty Thousand** Applications for Patents have been made through their Agency. More than **One Hundred Thousand Inventors** have sought the counsel of the Proprietors of the **SCIENTIFIC AMERICAN** concerning their inventions. Consultations and advice to inventors, by mail, free. Pamphlets concerning Patent Laws of all Countries, free.

☞ **A Handsome Bound Volume**, containing **150** Mechanical Engravings, and the United States Census by Counties, with Hints and Receipts for Mechanics, mailed on receipt of 25c.